

INTEGRATED TRENDING AND PLOTTING SYSTEM
(ITPS)

SYSTEM USERS' GUIDE
Revision K

March 20, 2007

Prepared for:

**U.S. Geological Survey
NASA/Goddard Space Flight Center
Code 428.1
Greenbelt, MD 20771**

And
**National Aeronautics and Space Administration
Mission Applications Branch
Goddard Space Flight Center
Code 583
Greenbelt, MD 20771**

Prepared By:

**Honeywell Technology Solutions Inc.
Columbia, Maryland**



Integrated Trending and Plotting System (ITPS)
System Users' Guide
Revision K

Issue Date: **March 20, 2007**

Effective: **March 20, 2007**

Preface

This document, the Integrated Trending and Plotting System (ITPS) System Users' Guide, provides the information required by users to understand and use ITPS and reflects most recent software release of ITPS.

The ITPS system has generic components as well as mission specific components. The body of this document is directed to all users and reflects the generic nature of ITPS. Mission specific information is contained in the mission specific document appendixes.

Questions concerning this document or ITPS should be addressed to:

itps@honeywell-tsi.com

or to:

ITPS Team Lead
System Engineering and Technologies (SET) Division
Honeywell Technology Solutions Inc (HTSI)
Goddard Corporate Park
7515 Mission Drive
Lanham, MD 20706

Section 1	ITPS Overview.....	1
Section 2	Main Interface and Displays	2
2.1	ITPS Main Interface	2
2.2	Event Viewer Window	2
2.3	Request Viewer.....	3
2.4	Exiting the ITPS Main Interface.....	5
Section 3	ITPS Plot Generation.....	7
3.1	Generating ITPS Plots (using default settings).....	7
3.2	Using Interactive Plots.....	10
3.2.1	Activating Interactive Plots.....	10
3.2.2	Exiting Interactive Plots.....	11
3.2.3	Plot Screen Overview	11
3.2.4	Navigating Plots	12
3.3	Customizing Plot Properties	26
3.4	Plot Customization Features.....	29
3.4.1	Custom Plot Title.....	30
3.4.2	Plot Page Custom Parameters	30
3.4.3	Plot Page Attributes	37
3.5	Miscellaneous Interactive Plots Features.....	39
3.5.1	Command Panel	39
3.5.2	Redraw Plot Page	39
3.5.3	Polyfit	39
3.5.4	Saving Plots as Images	41
3.5.5	Exporting Plots to Windows Clipboard.....	42
3.5.6	File Management	42
3.5.7	Dual Y-Axes	43
3.5.8	Editing Graph Titles	43
3.5.9	Modifying Tickmarks	43
3.6	Plot Management.....	44
3.7	Selecting Default Plot Printer.....	45
3.8	Using TDFs to Generate Multiple Plot Start and Stop Times.....	46
Section 4	ITPS Report Generation	49
4.1	Report Types	49
4.2	IDFs for Report Generation	49
4.3	Mnemonic (ASCII) Report Generation.....	50
4.3.1	Using TDFs to Enter Multiple Report Start and Stop Times	54
4.3.2	Monitoring Submitted Report Requests.....	55
4.3.3	Saving and Loading Saved Report Requests.....	55
4.4	Mnemonic Change (Delta) Report	56
4.5	Limit Report	58
4.6	Statistics Report.....	60
4.7	Trip Count Report.....	61
4.8	Trip Time Report.....	62
Section 5	ITPS Lifetime Trend (LTT) Data.....	63
5.1	Adding Data Points to Lifetime Trend (LTT) Data	63
5.2	Extracting Selected Lifetime Trend Data	66
5.3	Edit/Create Lifetime Trend IDF.....	68
5.4	Removing LTT Data.....	70
Section 6	IDF Editor.....	73
6.1	Starting IDF Editor.....	73

6.2	Selecting IDF Mnemonics.....	74
6.3	Selecting Mnemonics using Existing IDFs.....	75
6.4	Searching for Mnemonics in IDF Editor.....	76
6.5	Filtering Displayed Mnemonics in IDF Editor.....	77
6.6	Selecting Simple Plot Page and Graph Settings.....	78
6.7	Applying Data Screening to Selected Mnemonics	79
6.7.1	Filtering Data using IDF Filter Expressions	79
6.7.2	Sampling Data Values	82
6.7.3	Orbital Condition Data Screening	83
6.7.4	Specifying Threshold Screening Value.....	84
6.7.5	Requesting Statistics in IDF.....	85
6.7.6	Specifying Output Format	87
6.7.7	Plotting Parameters	88
6.7.8	Trip Count and Trip Time Settings.....	89
6.7.9	Time Expansion Setting.....	90
Section 7	Daily Production	91
7.1	Daily Production of Plots.....	92
7.2	Daily Production of Reports.....	94
7.3	Daily Production of LTT.....	97
7.4	Manual Execution of Daily Production Jobs	99
Section 8	Tools and Utilities.....	102
8.1	Selecting Alternate Mnemonic Databases.....	102
8.2	Creating a new ITPS Mnemonic Database.....	103
8.3	Configuring Automatic Database Switching	104
8.4	User Defined Pseudo Mnemonics	105
8.4.1	Creating User Defined Pseudo Mnemonics.....	106
8.4.2	Built-in Pseudo Functions	109
	• COS	110
8.4.3	Pseudo Function Order of Precedence	110
8.4.4	Editing User-Defined Pseudo-Mnemonics.....	111
8.5	Mnemonic Browser Utility	113
8.6	IDF Verify Utility.....	116
8.7	Time Definition File (TDF) Editor Utility	118
Section 9	Data Ingestion.....	123
9.1	Operation	123
9.2	Pausing Ingest.....	125
9.3	Input Data Quality (IDQ) Reports	125
9.3.1	Active Input Data Quality Viewer	126
9.4	Digest.....	129
9.4.1	Static IDQ Reports	130
9.4.2	Batch Data Quality Generation	132
9.4.3	Archive Dump Tool	133
9.4.4	Archive Data Deletion	134
9.5	APID Configurator	136
9.6	Importing External Mnemonics.....	137
Section 10	ITPS Web Access	139
10.1	Accessing the ITPS Web Site	139
10.2	Generating Reports via the Web	140
10.3	Generating Plots via the Web	143
10.4	Extracting Lifetime Trend Data via the Web	148
10.5	Editing Plots (Y Scale) via the Web.....	151
10.6	Generating IDFs via the Web	153

10.7	Web Viewing ITPS Files	156
10.8	Web Mnemonic Browser	156
Appendix A	IDF Format.....	161
A.1	Order of Precedence	163
Appendix B	ITPS Configuration and Properties.....	165
B.1	ITPS Property Settings.....	165
B.2	Miscellaneous ITPS.ini Properties	173
B.3	ITPS.ini GMSEC Properties	177
B.4	Default Multiple Mnemonics per Graph ITPS.ini Settings	192
Appendix C	Running Job Requests from the Command Line.....	195
Appendix D	Plot File Syntax.....	199
Appendix E	ITPS Group Privileges.....	203
Appendix F	Ingest Input File Naming Conventions.....	205
Appendix G	Ingestion of External Data	207
Appendix H	SOHO Specific Information	209
Appendix I	Landsat 7 Pseudo-Mnemonics.....	211
Appendix J	WIND and POLAR Level Zero Block Locations	219
Appendix K	GMSEC Configuration.....	221
Appendix L	Data Capture Utilities	223
L.1	ReadFeds.....	223
Appendix M	ITPS Acronyms and Abbreviations	227

Section 1 ITPS Overview

The Integrated Trending and Plotting System stores, analyses and displays satellite narrowband (housekeeping) telemetry. The major functions are as follows:

- Plot Generation:** Telemetry data can be examined graphically via the generation of telemetry plots. Plots may be customized and manipulated interactively, stored and printed (*Section 3*).
- Report Generation:** ITPS generates data analyses reports in a variety of formats. Some of these reports include ASCII formatted telemetry value reports, statistics reports, limit generation reports, delta violation reports, etc. Section 4 details the different types of reports and the options available in their generation.
- Lifetime Trend:** The ITPS Lifetime Trend Database is a collection of reduced resolution telemetry values in the form of statistics. These data points (daily, hourly, by-orbit) can then be viewed in reports or plots (*see Section 5*).
- Data Ingestion:** ITPS ingests raw mission telemetry into the ITPS telemetry Archive. The Archive, composed of single day telemetry files (YYYYDDD.<MISSION>) contains data extracted from spacecraft real-time and playback files. The compilation of the data and composition of the Archive files is referred to as Data Ingestion. (*Section 9*). Once the data has been ingested into the Archive, it can be extracted and analyzed by other ITPS components. (While most missions choose to store and analyze data based on their spacecraft timestamp, some choose to do these functions by ground-receipt time. Missions interested in this feature should contact their ITPS representatives.)
- Web Access:** ITPS is available to remote users who can generate products and view existing products via the web (for missions choosing to implement this feature) (*0*).

Section 2 Main Interface and Displays

2.1 ITPS Main Interface

Users control ITPS and generate and manipulate products via the ITPS Main Interface (see *Figure 1*).



Figure 1: ITPS Main Interface

The ITPS Main Interface contains controls for most of the major components of ITPS including:

- Generation and viewing of Plots (see *Section 3 Plot Generation*)
- Generation and viewing of Reports (see *Section 4 Reports Generation*)
- Generation and extraction of Lifetime Trend (see *Section 5 Lifetime Trend*)
- Monitoring and controlling Ingest Progress (see *Section 9.3.1 AIDQ Viewer*)
- Managing ITPS Mnemonic Database (see *Section 8.1 and 8.2*)
- Report IDF Creation (see *5.3*) and Verification (see *Section 8.6*)
- TDF Editor (see *Section 4.3.1 and 8.7*)
- Management of ITPS Settings (see *Appendix B*)
- Tools and Utilities (see *Section 5*)

Note: Access to ITPS at the MOC is restricted to users that belong to one of the following MOC Windows groups: MOC, MOC-POWER, and PDB_FM (see Appendix E for more on ITPS groups and capabilities).

2.2 Event Viewer Window

The ITPS Event Viewer Screen displays all the general event log messages generated by selected ITPS processes. This window is opened when the ITPS system is started. It can be minimized or closed.

To manually open the Event Viewer window:

- Select “Tools” from the ITPS Main Interface menu (see *Figure 2*).



Figure 2: ITPS Event Viewer Selection Menu

- Click the “Event Viewer...”. This will activate the Event Viewer window (see Figure 3).

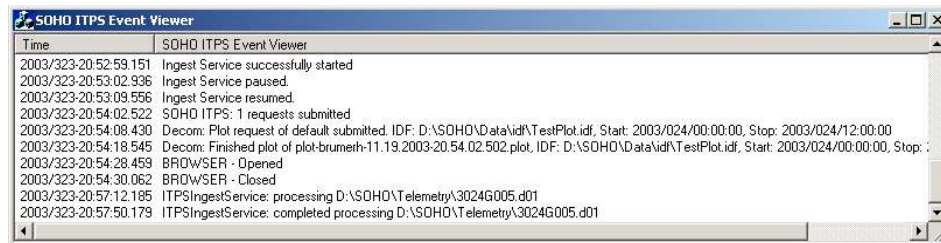


Figure 3: ITPS Event Viewer Window

The Event Viewer window displays messages that are generated after the window is opened. Thus it is advised that users should not close an Event Viewer window once it is opened; all the messages in that window will be lost and will not be visible in Viewer windows that are opened subsequently.

Note: All event messages are maintained in text files. Users can read the event message files to review event messages that are no longer available in the Event Viewer window, or to read event messages that are too long to view in the Event Viewer window. The event message log files are stored in the directory specified in the ITPS.ini file (see Appendix B).

2.3 Request Viewer

ITPS displays the state of submitted requests in the Request Viewer (see Figure 5). Pending and processing requests are maintained in the upper part of the screen. Requests that have been completed (as well as killed or cancelled requests) are displayed in the lower part of the screen.

To view the Request Viewer window:

- Select “View” from the ITPS Main Interface menu (see Figure 4).
- Select “Request Viewer”.

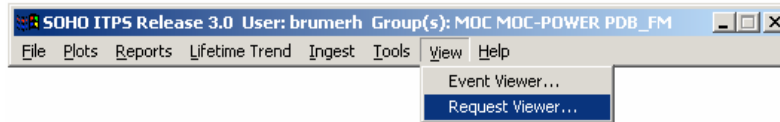



Figure 4: ITPS Request Viewer Selection


Double-click on the completed job entry in the completed job portion of the Request Viewer screen to activate completed plot, report or LTT extraction.







Queued pending requests may be deleted from the list of requests. Likewise, requests that are already running (labeled as “Processing”) may be killed. To do this, highlight an item (or items) and click on the  icon (or press the ‘Delete’ key).

Note: The capability to delete jobs may be restricted, based what ITPS group the user belongs to. Routine users may delete their own jobs, but not jobs of other users. Users belonging to MOC-POWER MS Windows OS group may delete jobs of any user. Any user at the MOC can use the Request Viewer window to kill jobs submitted over the web (see Appendix E for more on ITPS groups and capabilities).

Request Viewer [Jobs: 30]									
Actions									
Pending Requests									
Status	User	IDF	Start Time	Stop Time	Output File	Report Type	% Complete	Time Remaining	Job Started At
PROCESSING	brumerh	4power.idf	1999/365/23:39:38	2000/001/01:18:31	Orbi3792-LTT	LTT	100	000-00:00:00.000	2003/070/22:10:3
PROCESSING	brumerh	4power.idf	2000/001/01:18:31	2000/001/02:57:24	Orbi3793-LTT	LTT	100	000-00:00:00.000	2003/070/22:10:3
PROCESSING	brumerh	4power.idf	2000/001/02:57:24	2000/001/04:36:17	Orbi3794-LTT	LTT	0	TBD	2003/070/22:10:4
PENDING	brumerh	4power.idf	2000/001/04:36:17	2000/001/06:15:10	Orbi3795-LTT	LTT	0	TBD	TBD
PENDING	brumerh	4power.idf	2000/001/06:15:10	2000/001/07:54:03	Orbi3796-LTT	LTT	0	TBD	TBD
PENDING	brumerh	4power.idf	2000/001/07:54:03	2000/001/09:32:55	Orbi3797-LTT	LTT	0	TBD	TBD
Completed Requests									
Status	User	IDF	Start Time	Stop Time	Output File	Report Type	% Complete	Job Started At	Process Time
DONE	brumerh	4power.idf	2000/001/00:00:00	2000/001/00:01:00	DeleteMe.csv	ASCII	100	2003/070/21:58:07	00:00:15
DONE	brumerh	daily1.idf	2000/100/00:00:00	2000/102/00:00:00	DeleteMe.csv	ASCII	100	2003/070/21:42:34	00:09:11
DONE	brumerh	4power.idf	2003/017/23:29:16	2003/018/01:08:09	DyP20030180rbi200...	LTT	100	2003/070/20:53:15	00:00:21
DONE	brumerh	4power.idf	2003/017/21:50:23	2003/017/23:29:16	DyP20030180rbi199...	LTT	100	2003/070/20:53:04	00:00:24
DONE	brumerh	4power.idf	2003/017/20:11:30	2003/017/21:50:23	DyP20030180rbi199...	LTT	100	2003/070/20:52:57	00:00:23
DONE	brumerh	4power.idf	2003/017/19:32:37	2003/017/20:11:30	DyP20030180rbi199...	LTT	100	2003/070/20:52:41	00:00:32
DONE	brumerh	4power.idf	2003/017/16:53:44	2003/017/18:32:37	DyP20030180rbi199...	LTT	100	2003/070/20:52:21	00:00:41

Figure 5: Request Viewer

Jobs listed in the Request Viewer will remain listed until they are manually cleared. This is so users can review which jobs are already complete. Once reviewed the list should be purged for efficiency reasons. To purge completed jobs from the list, highlight the done jobs and click on the  icon (or press the 'Delete' key). To purge all jobs from the Request Viewer (regardless of current state) press the 'F9' key.

Pending jobs may be moved around the Pending Requests portion of the Request Viewer. To advance or reorder pending jobs, highlight a job or jobs in the Pending Requests area of the screen. Use the  or  button to move pending jobs up or down. Use the  or  arrows to move pending jobs to the top or bottom of the pending/processing jobs list. Use the pause button  and re-start button  to control a job that has already started.

To temporarily pause updates to the Request Viewer (to examine job details or to reorder the pending jobs list) select "Pause Viewer" from the Actions option on the Request Viewer menu. The viewer will remain in its paused state until un-paused by the user using the same menu option.

2.4 Exiting the ITPS Main Interface

To exit ITPS, select "Exit" from the "File" pull-down menu on the ITPS Main Interface. Exiting from the user interface will not affect submitted job requests. Once queued, these jobs will run to completion.

Section 3 ITPS Plot Generation

Mission telemetry data can be viewed graphically via ITPS generated plots displaying telemetry values for selected timeframes. Plots can be generated quickly and easily using default settings of ITPS. If needed, the plot generation process can be customized with a wide range of options.

Note: The term 'graph' refers to a graphic display of a mnemonic with a single X and a Y-axis. The term 'plot page' or 'page' refers to a collection of one or more 'graphs' stacked vertically on a single display screen. The term 'plot' refers to a collection of one or more 'plot pages'.

A plot page may contain up to eight graphs. A plot page may contain no more than 16 mnemonics total (including all graphs). A plot file may specify no more than 200 pages.

3.1 Generating ITPS Plots (using default settings)

ITPS plots can be generated quickly using default plot settings. When using default settings, requested mnemonics are drawn on graphs based on the order specified in the selected Input Definition File (see Section 6). The mnemonics are plotted using default plot attributes (see Figure 9 for sample plot using default plotting parameters). Section 3.4.2 describes plotting settings and descriptions.

To generate a plot using default settings:

- Select "Plots" from the ITPS main interface menu bar (see Figure 6).



Figure 6: ITPS Main Menu – Plots

- Choose "Request Plots" to activate the "Request Plots" screen (see Figure 7).

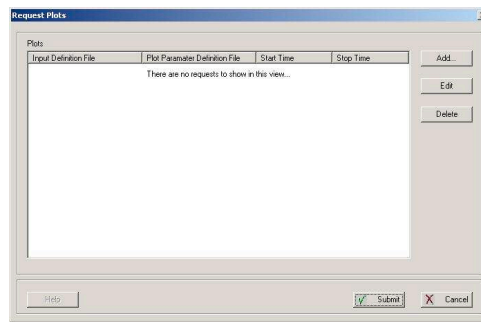


Figure 7: Request Plots Screen

- Click the “Add” button to activate the plot “Request...” specification screen (see Figure 8).

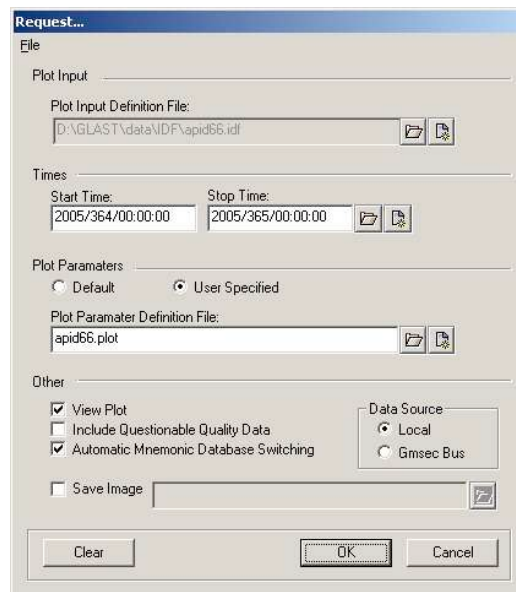






Figure 8: Plot Request Specification Screen

- Select a plot input definition file in one of 3 ways:
 - Type the name and path of an existing Input Definition File (IDF) file,
 - Click the browse file folder icon  to select an existing IDF or
 - Click the editor  icon to activate the IDF Editor tool to create an IDF (see Section 6 for an in-depth description of the IDF Editor).

NOTE: The IDF selected or created must have valid plot Page and Graph numbers for all mnemonics to be plotted (see Section 6.7.7 for IDF Editor plotting parameters).

IDF file names may not contain any spaces. In addition, Windows disallows the “?”, “”, “/”, “\”, “.”, “””, “<”, “>”, and “|” characters.*

- Enter the “Plot Start” and “Plot Stop” times or click the  icon to use an existing TDF. Alternatively, click the  icon to activate the TDF Editor (see Section 3.8).

NOTE: Missions that store telemetry by ground-receipt time (in addition to the standard spacecraft time) can choose to generate plots using ground-receipt time by checking the “Use G/R Time” box (see Figure 8). Missions without this capability will not have this option available on the request specification screen.

- Select “Default” for the Plot Parameters selection.
- Check “View Plot” to automatically view the generated plot file upon completion (see Figure 9 for sample default plot).
- Check the “Include Questionable Quality Data” box to include data that failed Reed-Solomon (RS) or other applicable quality checking (for missions where quality data is available in ITPS telemetry).
- Check the “Automatic Mnemonic Database Switching” box to have ITPS automatically determine which Mnemonic Database is best suited to data points requested. (See Sections 8.1 and 8.2 for information regarding selection and creation of Mnemonic Databases. See Section 8.3 for information on configuring automatic database switching.)
- Check “Save Image” and select a directory to have images of all plots saved as jpeg image files upon completion.

Note: See Section 3.5.4 for information on saving individual plots as images.

- Click the “OK” button to add the plot request to the request queue.

- Click the “Submit” button in the “Plot Requests” window (Figure 7) to begin generating the plot.

Note: Default plot filenames are automatically generated and are derived from the current date and time. (For example: plot.01.17.2001-01.49031.csv.plot.)

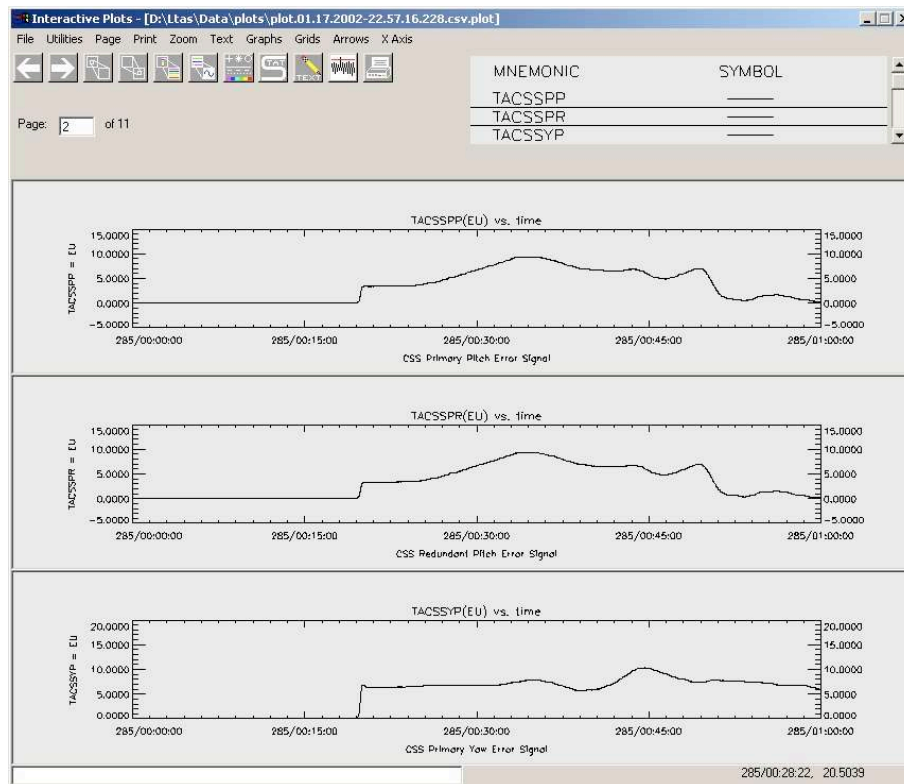


Figure 9: Sample Default Parameter Plot

3.2 Using Interactive Plots

Use Interactive Plots to view, edit, manipulate and customize plots. Interactive Plots also provides the ability to print plots, and convert them to image files as described below.

3.2.1 Activating Interactive Plots

Activate Interactive Plots in one of several ways:

ITPS System Users' Guide – Plot Generation

- Via the “Request Plots” process (Section 3.1): Check the ‘View Plots’ selection box on the “Requests...” screen (see Figure 8), (“Plots” | “Request Plots” | “Add”). Interactive Plots will automatically be activated with the requested plot once the request is completed.
- Via the Plot Manager tool (Section 3.6): From the ITPS main interface, select “Plots” | “Plot Manager”. Highlight a file to view and click “View Plot...”.
- Via the “View Plots” file browser: From the ITPS main interface, select “Plots” | “View Plots”. Select a plot to view. This will activate Interactive Plots with the requested plot displayed.

3.2.2 Exiting Interactive Plots

To exit Interactive Plots select “File” | “Exit” from the menu bar.

3.2.3 Plot Screen Overview

The management of plot customization and display options is done by using the controls available on the Interactive Plots menu bar and by utilizing the icons on top of the plot page (see sample page, Figure 10).

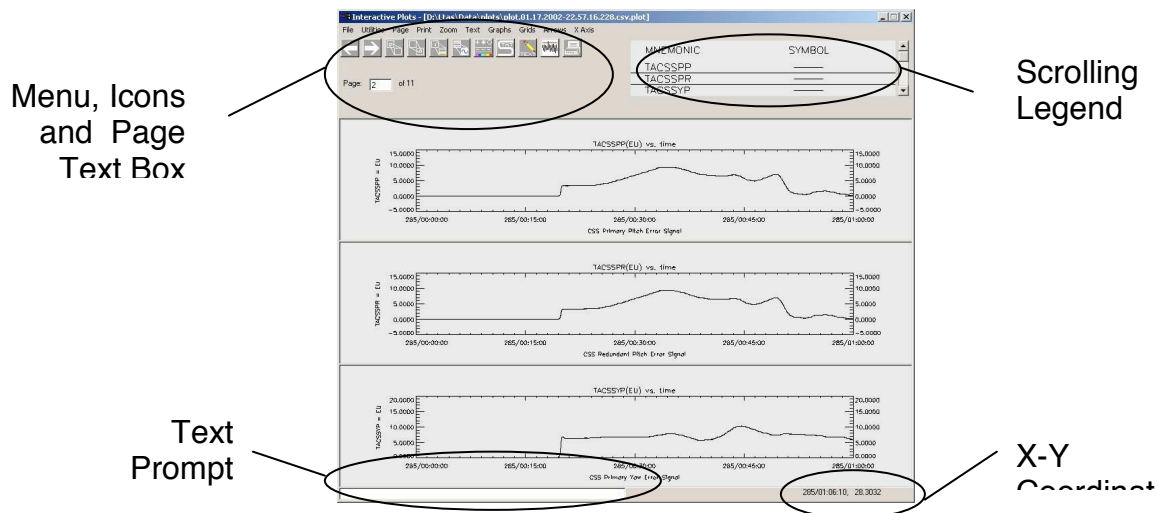


Figure 10: Interactive Plots Sample Plot

In addition to the actual graph region in the center of the plot page, the Interactive Plots display is divided into several notable control regions:

The **upper left** corner of the Interactive Plots screen contains the main menu, a change page text window and icons for common plot management actions (see *Section 3.2.4 for icon descriptions*).

The **upper right** displays a scrolling legend for all mnemonics displayed on the current plot page.



The **lower right** hand corner displays the x-y coordinates of the cursor as the mouse is moved around the plot page.

The **lower left** corner contains the text instruction and prompt area. This is where Interactive Plots provides text prompts for operator action or text responses.


3.2.4 Navigating Plots

Plots displayed in the Interactive Plots interface can be modified based upon the operator input. In addition, users can use the controls on the Interactive Plot page to customize the display and to isolate and focus on selected segments of plots.

3.2.4.1 Page Select


To move to another page (for a multi-page plot) enter the page number in the text box to view a that page, or click the  or  icons to advance or back up one page at a time.

3.2.4.2 Zooming In

To enlarge an area of a graph, click on the  icon (or select the “Zoom” | “Zoom X-Y” Interactive Plots menu selection). Follow directions in the text prompt area on the lower left of the Interactive Plots screen to identify the area to be expanded.

To zoom only the x or y-axis of a graph select the “Zoom” | “Zoom X” or “Zoom Y” menu options.

3.2.4.3 Zooming Out

To restore a graph window to its original view by zooming out, click on the  icon (or select “Zoom” | “Zoom Out” from the Interactive Plots menu). Double click on a graph which you wish to zoom out of (even for plots with only one graph).

3.2.4.4 Zoom All


To zoom in on all the graphs on a plot page using the same time range for all the graphs, click the  icon (or select “Zoom” | “Zoom All” from the menu bar). Enter the time range to zoom in on when prompted (see *Figure 11*). The initial values in the “Zoom All” time entry window are based on the start and stop times specified in the Plot Parameter Definition File (PPDF) (see *Sections 3.1 and 0*).



Figure 11: Zoom All Time Selection

To restore initial view, click “Reset” on the Zoom All time selection screen.

Note: If “Zoom All” is activated, “Zoom X”, “Zoom Y” and “Zoom XY” can not be activated and their menu options are ‘grayed out’.

Changes to a plot which are a result of “Zoom All” will not be saved when a plot is re-saved.

Note: When doing a “Zoom All” following a “Zoom X”, “Zoom Y” or “Zoom XY”, the “Zoom All” will reset the earlier zoomed graphs to the “Zoom All” values. Click “Reset” in the “Zoom All” window to reset the plot back to the values it had before “Zoom All” was performed. Click “Zoom Out” to un-zoom the “Zoom X”, Zoom Y or “Zoom XY”.

3.2.4.5 Maximize



To enlarge a single graph to occupy the entire plot page (for plot pages that contain more than one graph) click the  icon and select the graph to enlarge. Select the graph number to blow up (see *Figure 12*).



Figure 12: Maximize Graph Blow Up Selection

To restore the sizes of all the graphs on the plot page, click the  icon and click on the “Reset” button.

3.2.4.6 Resize Plot Window

The entire Interactive Plots window can be resized as needed. This is often useful when accommodating large or small display monitors.

To resize the plot window:

- Select “Resize” from the Interactive Plots “Page” option.
- Select new plot size (in pixels) from the plot “Resize Values” screen (see

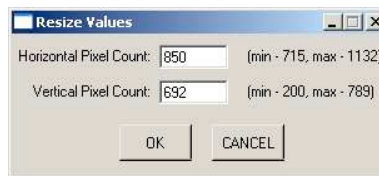



Figure 13 Plots Resize Window

Note: The maximum window size is based on the particular computer monitor size.

To change the default size of the window for all subsequent Interactive Plot sessions use the Tools | Properties | Plots option (see *Appendix B.1*).

3.2.4.7 Modify Attributes

To modify the graph display attributes, (make data points visible, display limit lines and/or limit shading, connect points, point symbol, line style and color) click the  icon (or select “Graphs” | “Parameter Attributes” from the Interactive Plots menu). Change the mnemonic display attributes on the “Attributes” screen (see *Figure 14*).

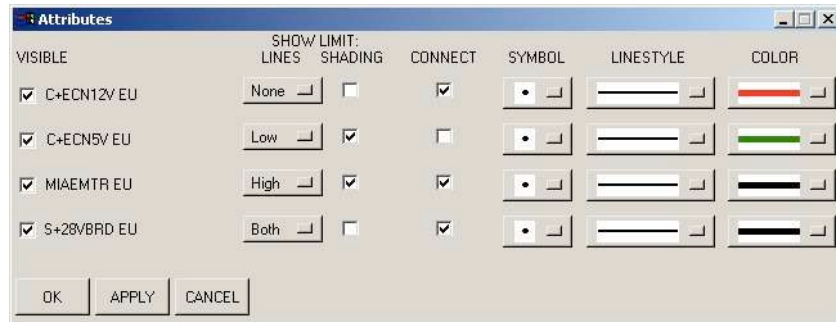


Figure 14: Plot Attributes Screen

Users can choose to display the mission database-derived high and low red/yellow limits on the plot page from the Interactive Plots 'Graph' | 'Parameter Attributes' selection screen. The limit line display settings can also be done during plot generation submission using the customization capabilities of the Plot Editor (see Section 3.4.2.3).

The following rules control the display of limit lines (see Figure 15) and limit shading (see Figure 16):

- Mnemonics with undefined limits cannot have limit lines displayed. If no limits are specified in the mission database, the limit conditions for the mnemonics are considered undefined.
- Mnemonics whose limit conditions depend on other mnemonics, have undefined limits when the mnemonic on which they depend is not available.
- Selecting Limit Shading for mnemonics with undefined limits generates a plot with a green background.
- If the user has selected 'Auto Scaling' for the Y axis (see Section 3.4.2.1) selecting to display limit lines on a plot may result in the Y scale being affected. When limit lines are displayed, the Y scale is adjusted to ensure that the limit lines are visible.
- If the user has specified a Y axis scale (turned off Auto Scaling mode [see Section 3.4.2.1]) it is possible for the limit lines to be out the visible area of the plot.
- If a mnemonic has exactly the same value as the limit and 'Connect Points' is activated, it is possible for the mnemonic values line color to overwhelm the limit line color.

ITPS System Users' Guide – Plot Generation

- The limit lines and limit shading capabilities are only available for mnemonic vs. time plots. They are not available for mnemonic vs. mnemonic plots.
- Limit shading may only be selected for the first mnemonic on a graph.

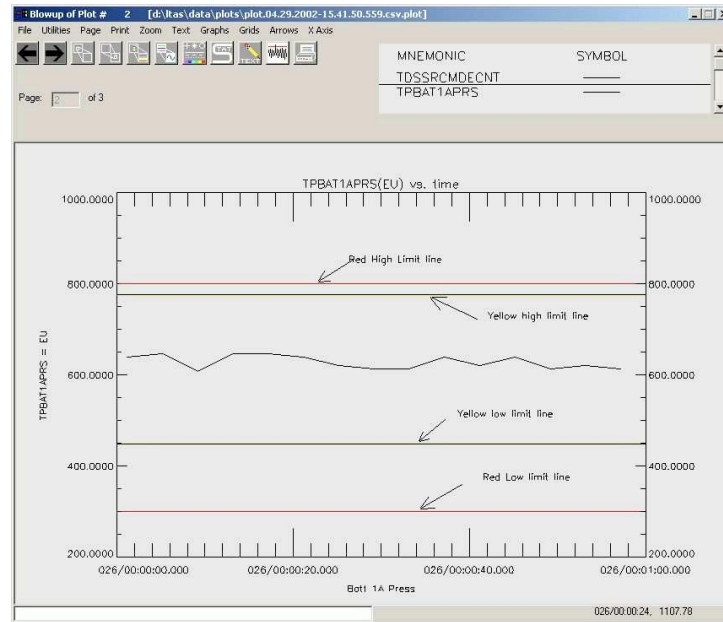


Figure 15: Plot Limit Lines

Figure 16 illustrates a sample of limit shading (note changed limits based on value of modal mnemonic).

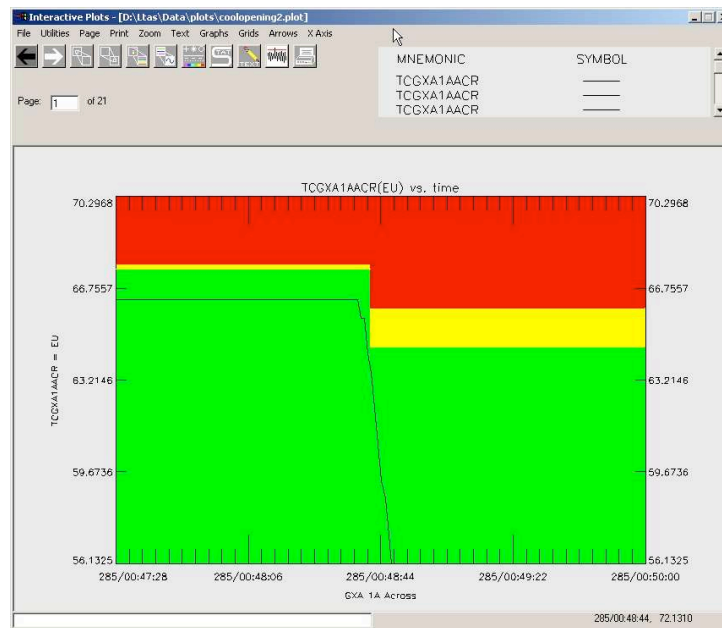



Figure 16: Plot Limit Shading (Modal Limit)


3.2.4.8 Display Info - Page Statistics

To view mnemonic statistics (minimum, mean, maximum, and standard deviation, number of points, etc. and polynomial coefficients when available) for all the mnemonics on a plot page, click on the  icon (or select “Page” | “Display Info” from the menu). The displayed statistics can be saved as an image to a file (see *Figure 17*).

MNEMONIC	MIN	MEAN	MAX	STDEV	POI
H1025APID	1025.0	1025.0	1025.0	0.00000	345
H1026APID	1026.0	1026.0	1026.0	0.00000	345
H1027APID	1027.0	1027.0	1027.0	0.00000	345

Figure 17: Page Statistics Display

3.2.4.9 Annotate Graphs

To add text to any portion of a graph, click on the  icon, (or select “Text” | “Annotate Text” from the Interactive Plots menu). When prompted, click on the point on the graph to which you wish to add text. Enter the text in the text entry box (see *Figure 18*).

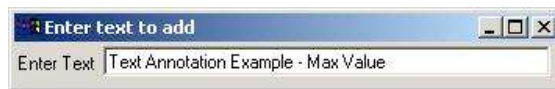


Figure 18: Text Annotation Entry

Press enter to complete (see *Figure 19*). Users may add up to 15 text annotations to any plot page.

Note: Annotation may not contain any comma characters.

If annotated text is added to a graph and placed outside the box of the graph (defined by where the mouse button is clicked), it may move or disappear on blowup or printing of the graph.

To remove (or edit) text annotation, select “Text” | “Delete Text” or “Edit Text” from the Interactive Plots menu. Click on the annotation you wish to delete or edit and follow prompts to finish the deletion or the edit.

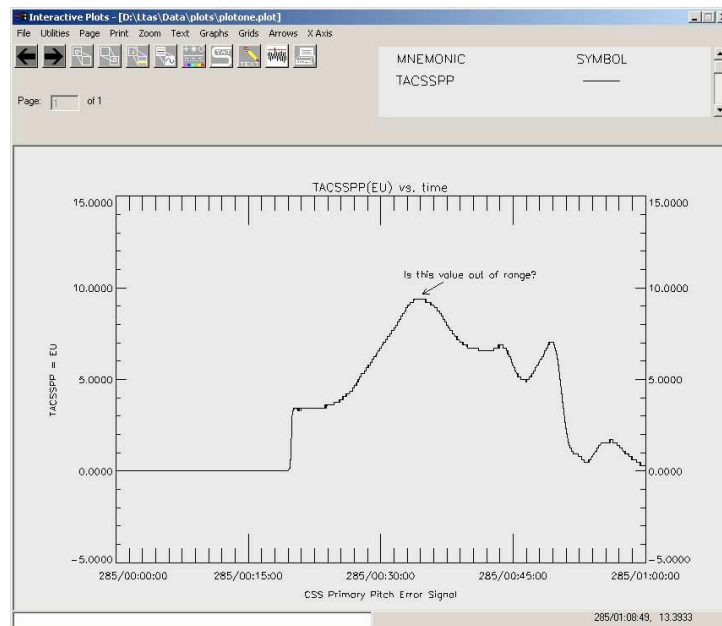



Figure 19: Text Annotation Example

3.2.4.10 Adding Threshold Lines

To add threshold lines across an entire graph, click the  icon or select the “Graphs” | “Add Threshold” selection from the Interactive Plots main menu. For multi-graph pages, select the plot to which to add threshold lines. From the threshold selection box (see *Figure 20*) enter the Y-axis coordinates, colors, and line styles at which to display threshold lines when prompted (up to 20 lines per page). Click ‘OK’ to update the plot page (see *Figure 21*).

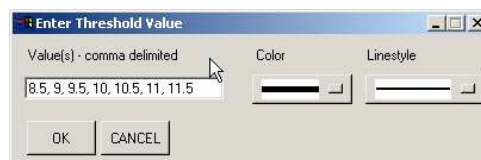


Figure 20: Threshold Value Selection Box

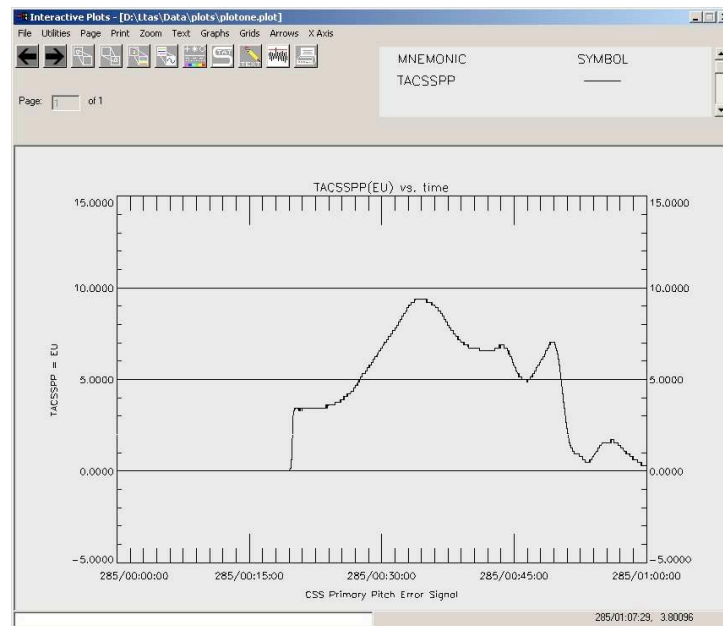


Figure 21: Graph with Threshold Lines

3.2.4.11 Adding Vertical Lines

Interactive Plots users can add vertical lines to a selected graph at specified x-axis (time) locations. To add vertical lines to a graph:

- Choose the “Add Vertical Lines” option from the “Graphs” menu option on the Interactive Plots main menu (see Figure 22).



Figure 22: Graph with Vertical Lines

- Follow the on-screen directions to select the plot to which to add the vertical lines.
- Enter the comma-delimited times at which to add vertical lines from the “Enter Vertical Line Value” window (see *Figure 23*).

Note: Enter times in ddd/hh:mm:ss format.

- Optionally, change the default color and linestyles from the same window.



Figure 23: Vertical Line Selection Window

- Select “OK” when done to overlay the selected graph with the selected vertical lines (see *Figure 22*).

3.2.4.12 Removing Vertical Lines

To remove a vertical line from graphs select the “Delete Vertical Lines” option from the “Graphs” menu option on the Interactive Plots main menu (see *Figure 22*). Follow the on-screen directions to select the graph from which to remove the vertical line. Click on the vertical line in the Interactive Plots window for which removal is desired.

3.2.4.13 Adding Grid lines

To add grid lines to a graph, select “Grids” from the Interactive Plots Menu. The gridlines will be drawn across the screen beginning from the major tickmarks (see *Figure 24*). Select which graph (for multi-graph plot pages) to add grid lines to.

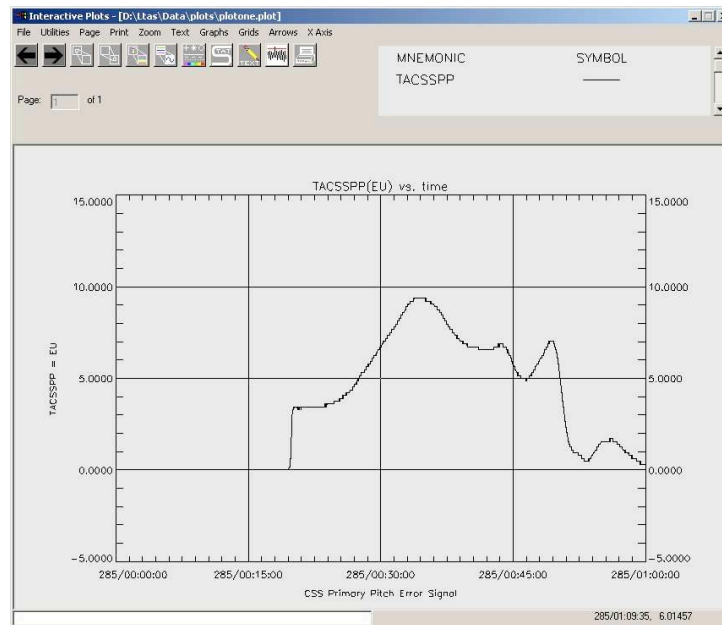


Figure 24: Plot Grid

3.2.4.14 Adding Arrows

Adding arrows can assist in highlighting points of interest on plot pages. Arrows can be used in conjunction with text annotation (see *Section 3.2.4.9*). Users may add up to 15 arrows to any plot page. To add arrows to Interactive Plot pages,

- Select “Arrows” from the Interactive Plots main menu.
- Select Black or Color.
- If selecting Color choose the color from the pull down menu.
- Right click the mouse at the point on the plot where the arrow should begin.
- Drag the mouse to the location of where the arrow point should be (see *Figure 25*).

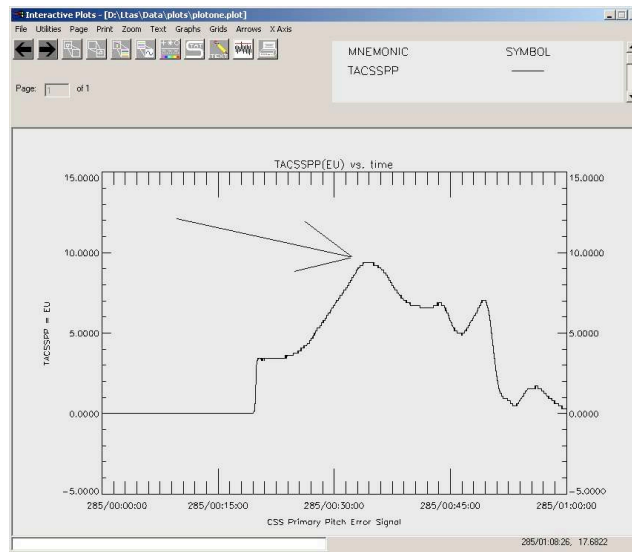


Figure 25: Plot Arrow Example

Note: The arrowheads and the arrow points are drawn proportional to the length of the arrow. Once drawn, the arrow will change size if the graph is zoomed (or maximized). When length of the line extends, the arrowheads will also change in size. This may make it appear as if the arrows "changed" position. This is not the case. The arrow lines will always point to the spot first specified.

3.2.4.15 Modifying X-axis Notation

Interactive Plots can alter the X-axis notation. By default the notation is the GMT. Notation can also be set to the seconds, minutes, hours or days since the beginning of the plotting period. This modification can be done when designing plots in the Plot Editor (see Section 3.4.2.2) or it can be done interactively in the plot window.

To modify plots using Interactive Plots:

- Select X-axis from the Interactive Plots main window (see Figure 26).
- Select the X-axis type.

- Click on the plot to which to apply the new X-axis.

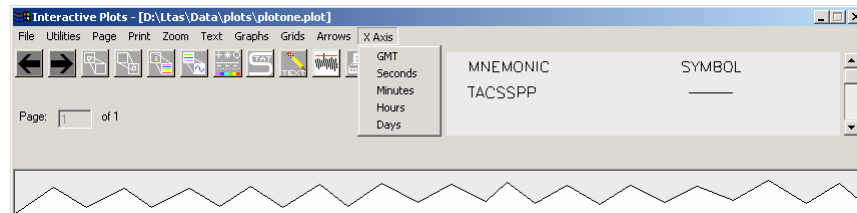



Figure 26: X-Axis Options

3.2.4.16 Printing

To print the current page, click on the  icon (or select "Print" | "Print This Page" from the Interactive Plots menu). The current page will be printed to the default printer. (See Section 3.7 for information on setting the default printer.)

To print all pages or a selection of pages, select "Print" | "Print these pages" or "Print all pages" from the menu.

Note: ITPS Interactive Plots has the capability to print plot pages in duplex (double-sided) mode when the printer is set to print duplex by default. There isn't anything additional users need to do within ITPS or Interactive Plots to take advantage of this. As long as the printer is set up to print duplex, Interactive Plots will take advantage of this.

Users can choose to print plot pages as landscape (the default is portrait). To select landscape, choose "Landscape" from the "Print" option on the Interactive Plots main menu. Please note that the setting on the current page will apply to all the pages in the current plot that are subsequently printed. If the current page has landscape selected, all pages will be printed landscape – even if the landscape selection is not activated on every page.

Note: ITPS Plots are printed as image files and therefore may be slow. The selection of the printing language can affect the speed. To change the printer language (Postscript® or PCL), choose “Tools” | “Properties” | “Print” from the ITPS Main Interface (see Figure 27). When printing in Postscript® mode it may be useful to use an external program to speed printing. See Section B.1 for setting these properties.

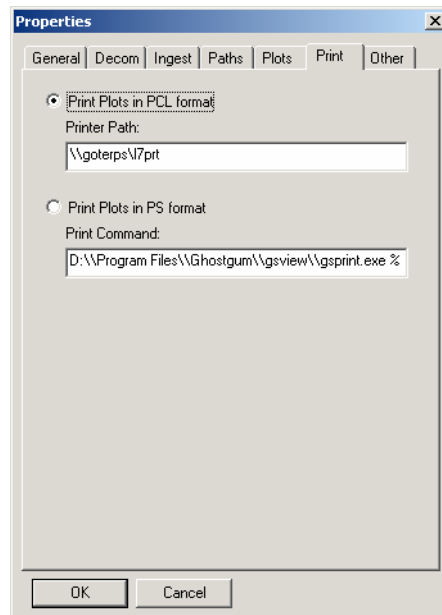


Figure 27: Print Properties

Plot pages are printed by default with a plot summary (see Figure 28).

FILE CREATED 09/29/2000 17:58:52							PAGE 1
START TIME:	MNEMONIC	MIN	MEAN	MAX	STDEV	POINTS	SYMBOL
2000/010	SFABORTCNT	2.3000	5.6000	8.9000	2.8402	4	—
00:59:30.000	SFADEBONAOFF	2.3000	5.6000	8.9000	2.8402	4	◇—◇
STOP TIME:	SFBCR1PVT	2.3000	5.6000	8.9000	2.8402	4	○—○
2001/120	SFBATSTAT_1	2.3000	5.6000	8.9000	2.8402	4	—
00:59:30.000	SFBCR1PVT	2.3000	5.6000	8.9000	2.8402	4	◇—◇
	SFADEBONAOFF	2.3000	5.6000	8.9000	2.8402	4	—
	SFBCR1PVT	2.3000	5.6000	8.9000	2.8402	4	○—○
	SFBCR1PVT	NO DATA AVAILABLE FOR THIS MNEMONIC					—
	SFBCR1PVT	2.3000	5.6000	8.9000	2.8402	4	○—○
	SFBCR1PVT	2.3000	5.6000	8.9000	2.8402	4	○—○
	SFBCR1PVT	2.3000	5.6000	8.9000	2.8402	4	○—○
	SFBCR1PVT	2.3000	5.6000	8.9000	2.8402	4	○—○

Figure 28: Sample Printed Plot Page Header Box

To print plot pages without the header box, mark the “Hide Info Box” selection (from the Interactive Plots I “Print” menu). To reactivate header box printing, unmark the “Hide Info Box” selection (see *Figure 29*).

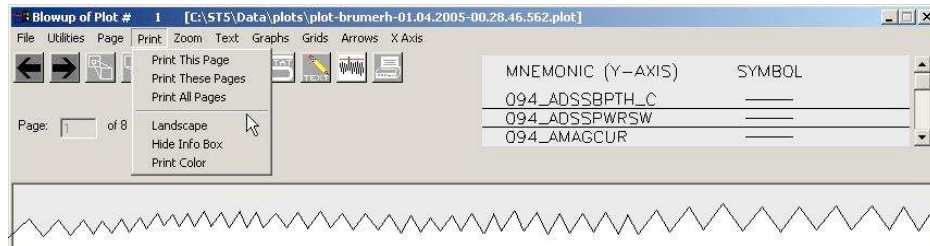


Figure 29: Print - Hide Info Box Selection

To print plot pages in color to a color printer select “Print Color” from the Interactive Plots I “Print” menu. Color printing is only available when the plot printing option is Postscript (PS). When the plots print option is PCL, the “Print Color” option will be grayed out. See Section B.1 for more on setting printer options.

Note: To print in color, the options on the printer must be set to print in color, either by setting the defaults of the printer or by specifically directing the printer to use color with a combination of Postscript printing and the gsprint command (see Appendix B.1 for more on setting print options).

3.3 Customizing Plot Properties

ITPS plots can be customized to display plots using a variety of styles and specifications. These plot customizations can control the display of the graph content as well as the scale, color, line style, tick marks in a wide range of options as described below.

To generate plots with customized settings:

- Select “Request Plots” from the ITPS main interface menu bar as described above in Section 3.1 (see *Figure 6*) to activate the “Request Plots” screen (see *Figure 7*).
- Click the “Add” button to activate the plot “Request...” specification screen (see *Figure 30*).

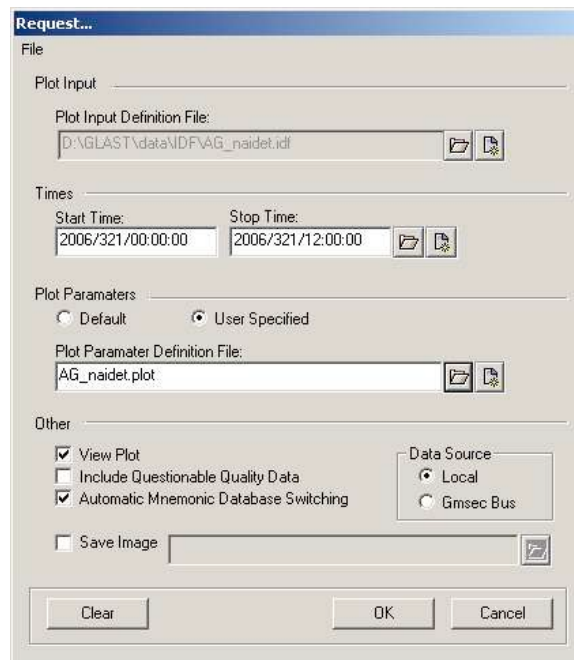






Figure 30: Plot Request Specification Screen

- Select an input definition file in one of 3 ways:
 - Type the name and path of an existing Input Definition File (IDF) file,
 - Click the browse file folder icon  to select an existing IDF or
 - Click the IDF Editor  icon to edit or create an IDF (see 5.3 for an in-depth description of the IDF Editor).

NOTE: The IDF selected or created must have valid plot Page and Graph numbers for all mnemonics that are to be plotted. The contents of the IDF must match the plot definition file (see Section 6.7.7 for IDF Editor plotting parameters).

IDF file names may not contain any spaces. In addition, Windows disallows the "?", "*", "/", "\", ".", "'", "<", ">", and "|" characters.

- Enter the Plot Start time.
- Enter the Plot Stop time. (Plot will stop right before this time.)
- Select "User Specified" for the Plot Parameters selection.

- Select a Plot Parameter Definition File (PPDF) in one of 3 ways:
 - Type the name of an existing or new PPDF,
 - Click the browse file folder icon  to select an existing PPDF or
 - Click the Plot Editor  icon to edit or create a PPDF (see Section 3.4 for custom features available).

NOTE: When the user allows ITPS to choose the PPDF name, the name of the created PPDF will be derived from the name of the IDF being used. (<idfname>.plot). The user may choose to overwrite existing PPDFs. To protect existing PPDFs from being overwritten, users may utilize the rename feature of the Plot Manager Screen (Section 3.6) to rename the existing file before overwriting the PPDF or they may type a new file name (file that does not exist) in the PPDF selection box.

NOTE: The plot file may contain a combination of any numbers, characters or symbols usually allowed in an MS Windows filename, but may not begin with three consecutive digits, nor may the file have any spaces or commas. In addition, Windows disallows the "?", "", "/", "\", ".", "'", "<", ">", and "|".*

- Check “View Plot” to automatically view the generated plot file upon completion (see Figure 9 for sample default plot).
- Check the “Include Questionable Quality Data” box to include data that failed was flagged by ingest as having questionable or bad quality data. (See Section 9 for more on data quality RS checking.)
- Check the “Automatic Mnemonic Database Switching” box to have ITPS automatically determine which Mnemonic Database is best suited to data points requested. (See Sections 8.1 and 8.2 for information regarding

selection and creation of Mnemonic Databases. See Section 8.3 for information on configuring automatic database switching.)


- Optionally (for missions in which ITPS can retrieve data via GMSEC) select Local/GMSEC data source.
- Click the “OK” button to add the report request to the report queue.
- Click the “Submit” button in the “Plot Requests” window to begin generating the plot.

3.4 Plot Customization Features

Below is an overview of the customization features available for ITPS plots. In addition to the features described here, users can experiment with the many customization features to become familiar with all the available options.

NOTE: Move the cursor around the Plot Customization screens to activate the ‘pop-up’ help descriptions.

To access plot customization features:

- Follow directions for selecting “Customizing Plot Properties” plot features as described in Section 3.3.
- Type a filename for the Plot Parameter Definition File (PPDF) or leave the PPDF field blank (to use the default filename) (see *Figure 30*).
- Click the PPDF Editor  icon to activate the “Plot Customization” screen.

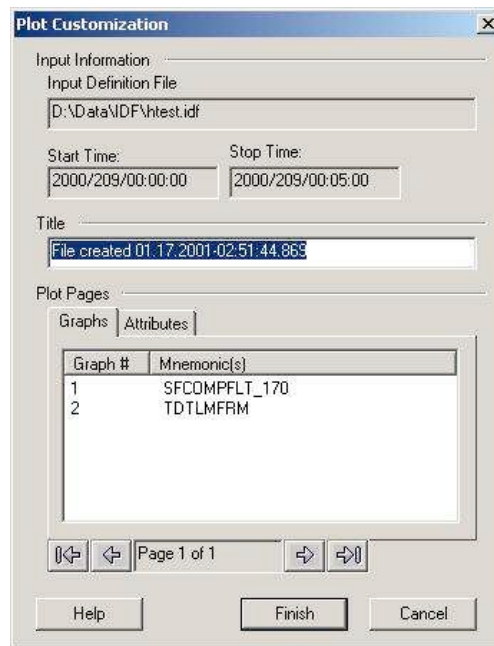


Figure 31: Plot Customization Screen

3.4.1 Custom Plot Title

Use the “Title” field to select an alternate plot title. (This title is only visible on printed plot pages.) See *Appendix C* for information on what may be contained in the title.

3.4.2 Plot Page Custom Parameters

The custom plot parameters described below can be accessed from the “Plot Customization” screen (see *Figure 31*) by double-clicking on any of the mnemonics displayed in the “Plot Pages” portion of the screen. Use the arrows on the “Plot Customization” screen to switch between plot pages.

NOTE: The designation of which mnemonics appear on each plot page is made by the mnemonic entry in the IDF. See Section 6.7.7 for plot page settings descriptions.

3.4.2.1 Graph Parameters

Select a mnemonic by double-clicking on a mnemonic name from the “Plot Customization” screen (see *Figure 31*), to access the “Customize Page” | “Graph” screen (see *Figure 32*). Use this interface to modify the values of plot parameters that apply to an entire graph.

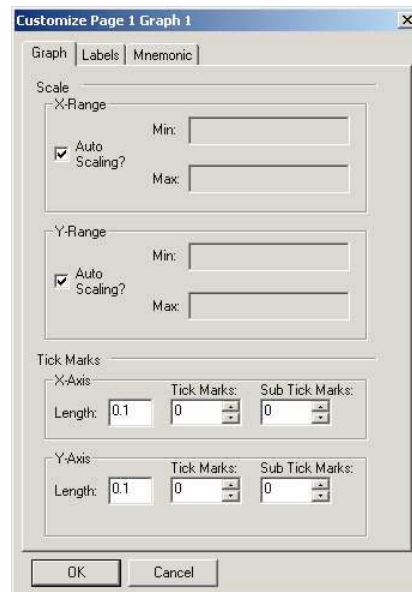


Figure 32: Customize Page 1 Graph Screen

Scale: Modify the scale of the x or y axis for a selected graph. By default, graph scales are auto-scaled based on the data values (for both x and y axes). For time ranges, values entered are the number of milliseconds from the start time of the plot. For value ranges the numbers entered are the actual values.

NOTE: The Y-Range selection may affect visibility of limit lines (and mnemonic data). Selecting 'Auto Scaling' will ensure that mnemonic data and any limit lines (see 'Display Limit Lines' in Section 3.4.2.3) are visible. If Auto Scaling is turned off, the Min and Max Y scale values may preclude visibility of limit lines and mnemonic data.

Tick marks: Modify length and the number of tick marks (and sub-tick marks) for the selected graphs. (By default the Y-axis tick marks are

determined by the time range, and the X-axis tick marks are automatically determined based on the times being plotted.) Entering 0 in any of the tick mark fields sets the parameter to the default value.

3.4.2.2 Label Parameters

Use “Customize Page” | “Labels” screen (see *Figure 33*) to modify graph label parameters. See *Appendix C* for details on what characters may be included in the graph labels.

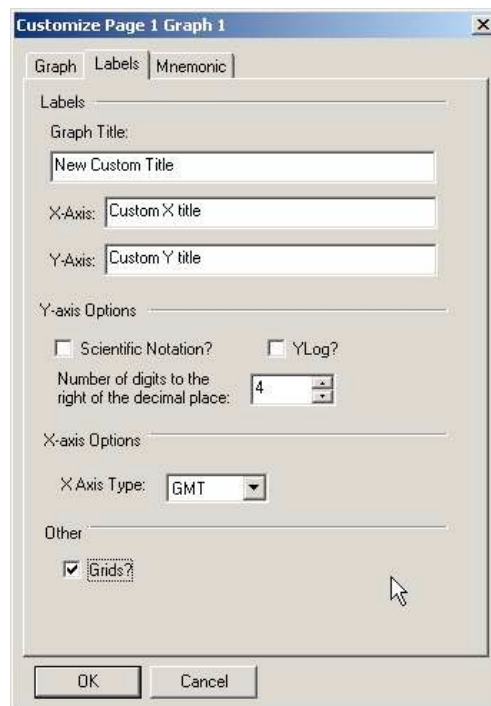


Figure 33: Customize Page | Labels Screen

Graph Title: Modify the graph title for the selected graph. By default the graph title is `<mnemonic> vs. time` where `<mnemonic>` is the name of the mnemonic being plotted.

X-Axis Title: Modify the X-Axis title. The default title is `time = GMT`.

Y-Axis Title: Modify the Y-Axis title. The default title is the name of the first mnemonic on a graph being plotted and the conversion (EU or RAW). If there is more than one mnemonic on a graph, only the name of the first mnemonic appears as the default Y-Axis title.

Scientific Notation:

Check the “Scientific Notation” box to display graph values in scientific notation. Default is to display the value in floating point format.

YLog:

Check the “YLog” box to display the Y-axis values and Y-axis label notation in logarithmic scale. The default is a linear scale. Ylog can only be applied to mnemonics where the Y-axis scales are greater or equal to 0. Negative Y-axis scale values (manual or auto scale) have undetermined results and must not be used.

Decimal Digits:

The decimal precision for display. Default is 4 digits (zeroes padded to the right of the decimal point).

X-axis Type: Choose an X-axis annotation. Default is telemetry GMT. Choose Seconds, Minutes, Hours or Days, to select an offset from the plot start time (in seconds, minutes, ...etc.) as X-axis annotation.

Grids:

Check this box to activate grid lines for the selected graph.

3.4.2.3 Mnemonic Parameters

Select the “Customize Page” I “Mnemonic” screen (see *Figure 34*) to modify the appearance of a selected mnemonic.

Select a mnemonic to customize by using the drop down box under the “Mnemonic Name” label. (This label will change to “Trigger” for mnemonic vs. mnemonic plots.)

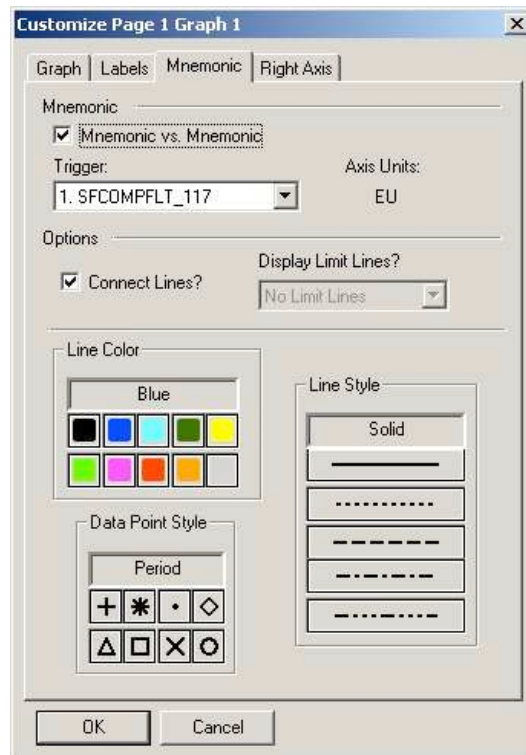


Figure 34: Customize Page Mnemonic Parameters

Mnemonic vs. Mnemonic:

Plot two of the mnemonics that are to be included on this graph against one another as mnemonic vs. mnemonic.

When choosing to plot two mnemonics in a mnemonic vs. mnemonic plot, one must be selected as the 'trigger' (points are plotted when a new value is found for the trigger mnemonic). (See Section 6.7.7.1 for information regarding setting page and graph numbers for mnemonic vs. mnemonic plotting.)

When plotting mnemonic vs. mnemonic values, the y-axis represents the first mnemonic (in IDF order) and the x-axis represents the second mnemonic (in IDF order).

Connect Lines:

Connect data points to create unbroken plot lines (default is ON).

Display Limit Lines:

Draw lines indicating red and yellow limits for selected mnemonics on the graph (see *Section 3.2.4.7 for details regarding activating limit lines*).

NOTE: Choosing to display limit lines on plots may affect the Y scale of the graph. If auto scaling is selected (see Section 3.4.2.1), the Y scale of the plot will change to accommodate the limit lines. If auto scaling is turned off, the Y scale settings may limit the visibility of the limit lines.

Line Color: Select line color for graph 'pen'.

Line Style: Select line style for graph 'pen' (valid when Connect Lines is ON). Default is based on the number and order of mnemonics on the graph.

Data Point: Select data point marker. Default is based on the number and order of mnemonics on the page.

NOTE: The default format of line color, line style and data point when there is more than one mnemonic line on a graph is implementation specific. See Section B.4 for information regarding specific implementations and options.

3.4.2.4 Dual Y-Axis Settings

By default both the right and left y-axes share the same scale. Graphs displaying values for two mnemonics (that are not mnemonic vs. mnemonic) can be

customized to display mnemonic specific y-axes. Users may select that the graph left-side y-axis scale be linked to the first mnemonic on the graph, and the right-side y-axis scale be linked to the second graph mnemonic, and customize the settings for each axis individually.

NOTE: Customized right-side y-axis is only available for graphs with exactly two mnemonics plotted mnemonic vs. time.

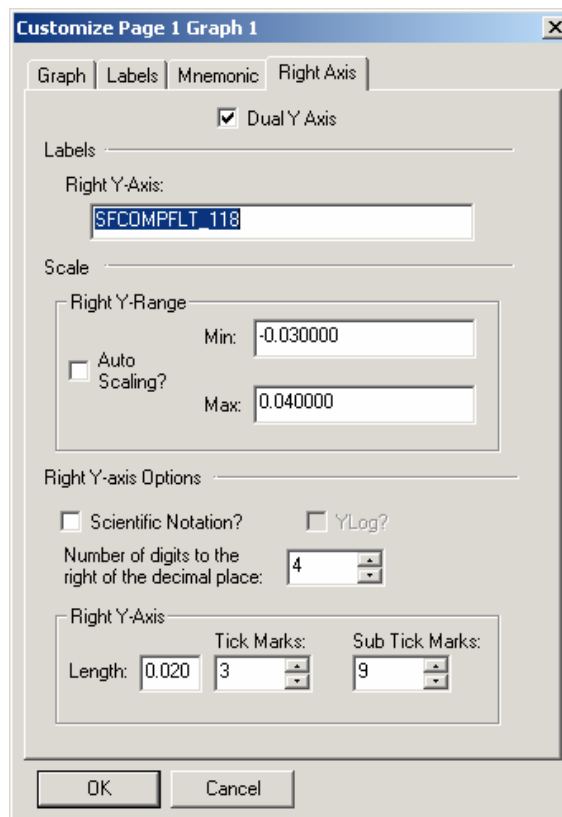


Figure 35 Right-side Y Axis Customization Screen

To display a mnemonic specific right-side y-axis:

- Select the “Graphs” tab from the “Plot Customization” screen (see Section 3.4).
- Activate the “Plot Pages” I “Graphs” screen.
- Double-click on any of the mnemonics displayed in the “Plot Pages” portion of the screen.

- Use the arrows on the “Plot Customization” screen to switch between plot pages.
- Select the Right Axis tab to access the right-axis customization settings screen (see Figure 35).
- Check the “Dual Y Axis” option.
- Customize the label, scale and options.
- Click OK when done and continue customization of the plot.

Dual y-axis settings may also be activated in an existing plot by using the y-axis setting in Interactive Plots (see Section 3.5.7). See Figure 40 for an example of a dual y-axis plot.

NOTE: The “Right Axis” tab is only available for graphs with exactly two mnemonic plots that are mnemonic vs. time.

3.4.3 Plot Page Attributes

To modify the attributes of the plot page select the “Attributes” tab from the “Plot Customization” screen (see Section 3.4) to activate the “Plot Pages” | “Attributes” screen (see Figure 36).

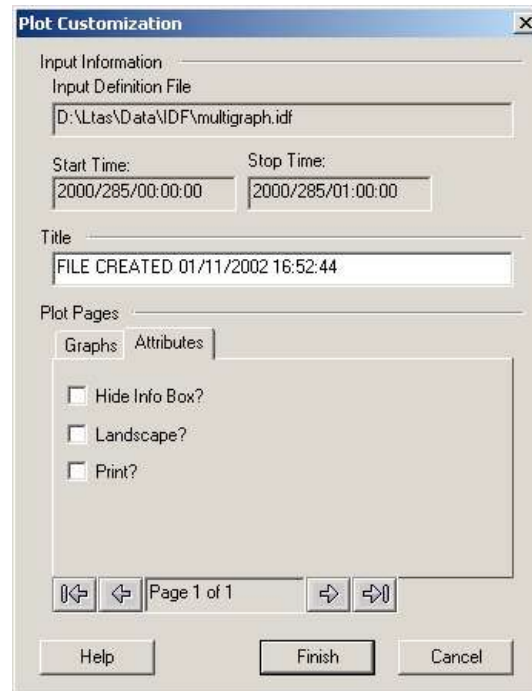


Figure 36: Plot Pages / Attributes Screen

Hide Info Box:

Check this box to hide the Interactive Plots page information box (that normally prints on the top of the page) to provide more space for large graphs.

Landscape: Check this box to print plot page in landscape mode.

Print: Check this box to automatically print plot pages when plotting is complete. (This only applies for requests submitted via daily production [see *Section 7.1* for details on plot generation Daily Production]). Requests submitted from the ITPS Plot Request screen (*Figure 30*) do not use this attribute.

3.5 Miscellaneous Interactive Plots Features

In addition to the Interactive Plots menu selections described in Section 3.2.4, there are several other options available that control the Interactive Plots display process.

3.5.1 Command Panel

Interactive Plots gives the user the ability to enter PV-Wave plot commands (external to or beyond what ITPS provides) directly. This capability can be used for debugging or for additional customization.

To open a command panel window select “Utilities” | “Command Panel” from the Interactive Plots menu bar. Enter commands in the lower portion of the screen (see *Figure 37*). Command history will be displayed on the upper portion of the screen.

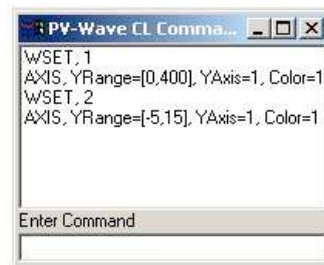


Figure 37: PV-Wave Command Box

3.5.2 Redraw Plot Page

To redraw the entire page (if the display should become corrupted or unclear) select “Page” | “Redraw” from the Interactive Plots menu.

3.5.3 Polyfit

ITPS gives the user the ability to apply a polynomial curve to a graph and to extrapolate values into the future based on available data points. To access these capabilities, open the Polyfit window by selecting “Utilities” | “Polyfit” from the Interactive Plots menu bar.

Select the mnemonic, the polynomial degree and extrapolation percent (the time field will automatically be updated to indicate the new ‘end of plot’ time based on extrapolation) (see *Figure 38*). Click ‘OK’ or ‘APPLY’ to accept. The polyfit line will be superimposed on the graph. In addition, the polynomial coefficients will be appended to the graph title (see *Figure 39*).

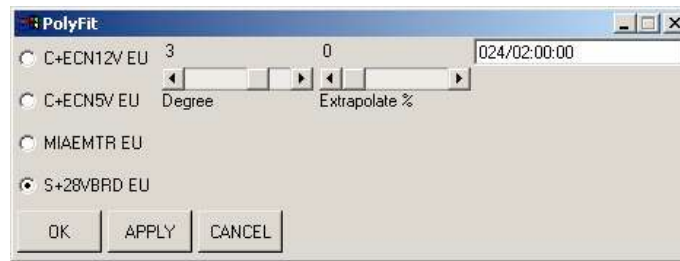


Figure 38: Polyfit Selection

To undo the 'Polyfit', reset the 'Degree' to 0 and the 'Extrapolate %' to 0. Click 'OK' or 'APPLY' to reset.

Note: Polyfit can only be done on single mnemonic graphs. If a graph has multiple mnemonics, Polyfit cannot be applied to it.

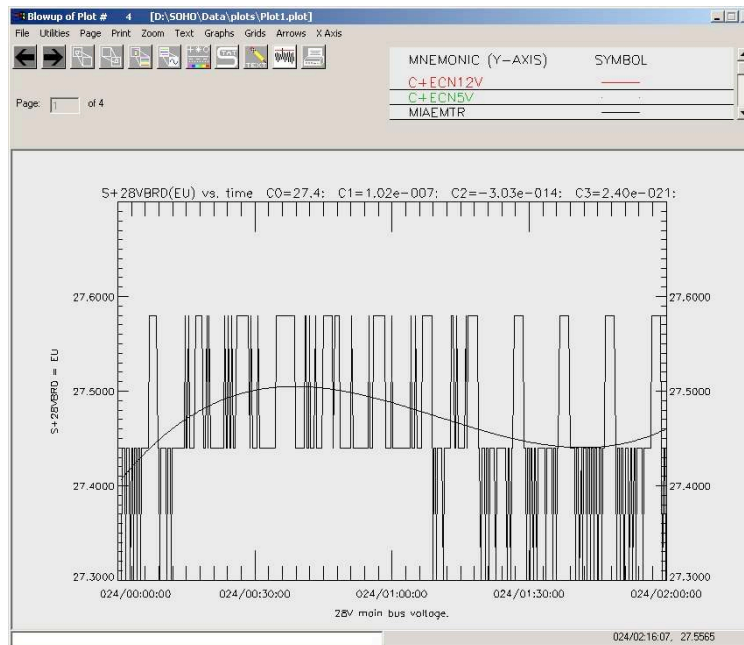


Figure 39: Plot Polyfit

Note: The printed coefficients and title may not always fit on the title line. To account for this, the precision of coefficients may be reduced for display. In some cases even this will not suffice and some coefficients are not displayed. If more coefficient display space is required the plot should be regenerated with more graphs on the page – forcing Interactive Plots to use a smaller font.

3.5.4 Saving Plots as Images

An image of an individual graph can be saved to disk. This image can then be e-mailed or included in a document. Interactive plots can save images in JPEG or GIF format.

To save a graph as in image file:

- Select “Graphs” | “Save Image” from the menu.
- Click on a graph to select it when prompted in the lower left text instruction field.
- Select a filename from the file selection window.

To save a file in JPEG format (compressed) give the file a .jpg extension. To save an image in GIF format (uncompressed) give the file a .gif extension. If no extension is given, it defaults to JPEG.

To save all plot pages to a Postscript file, select “Save As” from the “File” option of the Interactive Plots main menu. Choose “Postscript Files (*.ps)” from the file selection menu. Select an existing file or enter a filename for the Postscript plot destination.

To save a single plot page as a Postscript file, select “Save As Postscript” from the “Page” option on the Interactive Plots main menu. Select an existing file or enter a filename for the Postscript page destination.

Note: All of the plots in a file can be automatically saved as .jpeg files upon plot generation. See Section 3.1 for more on this process.

3.5.5 Exporting Plots to Windows Clipboard

Images of graphs displayed in Interactive Plots can be exported to the Windows clipboard. To copy an image to the clipboard:

- Select “Copy to Clipboard” from the Interactive Plots “Utilities” menu option.
- Click on the plot to be copied when prompted in the lower left text instruction field.
- Monitor status of the copy to clipboard in the lower left hand text instruction field.
- Copy graph image to external application when status reports that copy to clipboard is complete..

Note: ITPS Interactive Plots image export has been tested with several applications including MS Word, Excel, and Paint and is compatible with applications that accept DIB or EMF format data.

3.5.6 File Management

Use the “File” | “Open” menu option to (exit out of the current plot and) open a plot file available on the system.

Use the “File” | “Delete” option to delete plot files residing on the system. Users can also manage plot files by using the Plot Manager utility (*described in Section 3.6*).

3.5.7 Dual Y-Axes

By default, graph right y-axes mirror the left y-axes. When plotting two mnemonics on a single graph, users can choose to set the left axis to be based on the first mnemonic in the graph, and the right axis to be based on the second mnemonic in the graph. To change the y-axis setting, select the “Graphs” | “Dual y-axis” option (see Figure 40). Dual y-axis may also be set upon job submission using plot customization settings. See Section 3.4.2.4 for directions for using this capability.

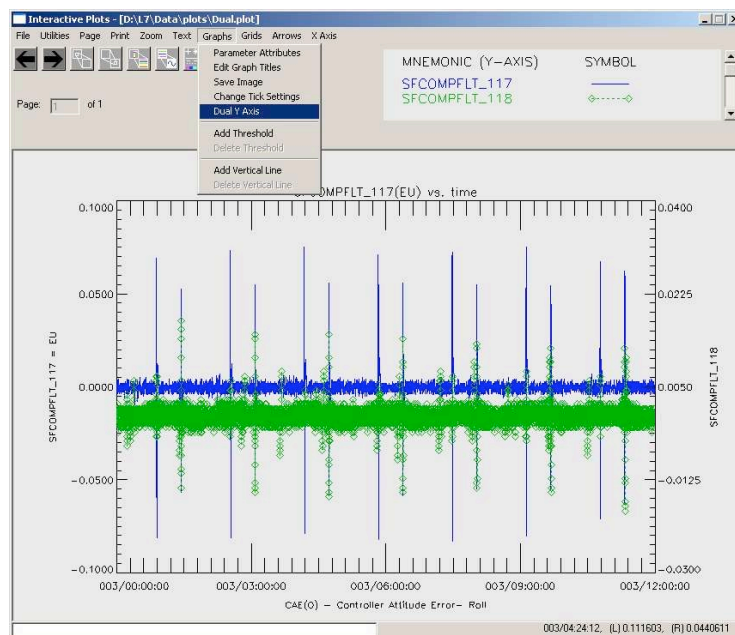


Figure 40 Dual Y-Axis Plot Option

3.5.8 Editing Graph Titles

To modify the title of a graph, use the “Graph” | “Edit Graph Title” option on the Interactive Plots main menu. Select the graph whose title is to be edited by clicking in it, and type the new title in the displayed text entry box. To delete a title entirely, put a space character in the title text entry box.

Any displayed plot polyfit coefficients will not be affected by the editing of the graph title text.

3.5.9 Modifying Tickmarks

Users can modify the length and number of tickmarks on any graph. To change the settings, select “Graph” | “Change Tick Settings” on the Interactive Plots main menu. The length and number of tickmarks can be set during plot generation by customizing a plot as described in Section 3.4.2.1.

3.6 Plot Management

The ITPS Main Interface provides the Plot Manager as central area managing plot collections.

Note: Plot collections are the plot format files and their corresponding data files. Together these are used to generate actual plots.

To activate the Plot Manager, select “Plots” | “Plot Manager” from the ITPS Main Interface (see *Figure 41*).



Figure 41: Plots - Plot Manager

Choose the plot collection you wish to view, either plots created locally or plots generated over the web. You may use the Search and Filter options to find plot collections easily. Select a Plot from the Plot Manager screen (see *Figure 42*) to display Plot information in the Plot Information segment of the screen.

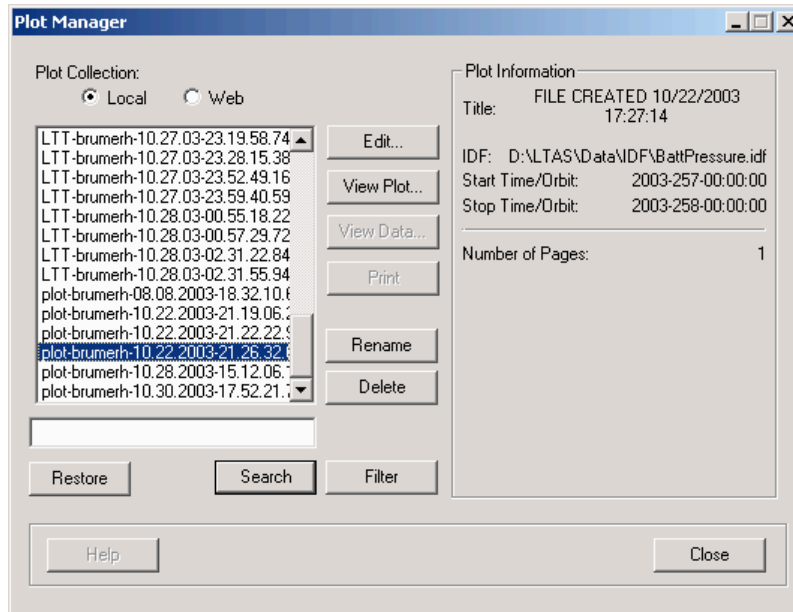


Figure 42: Plot Manager Screen

Use the Plot Manager to perform the following Plot maintenance tasks:

- **Edit:** Select a Plot Collection and click “Edit...” to activate edit a Plot Parameter Definition File (PPDF).
- **View Plot:** Select a plot collection and click “View Plot...” to activate Interactive Plots for the selected plot collection.
- **Rename:** Select a plot collection (or several collections) and click “Rename” to rename all associated files in the collection.
- **Delete:** Select a plot collection (or several collections) and click “Delete” to delete all files associated with a plot collection.

3.7 Selecting Default Plot Printer

ITPS plotting will print to whatever printer is selected as the ITPS default printer. To select or modify the default plot printer select the “Tools” | “Print...” interface. (see *Section B.1*). Once set this printer setting will be in effect for all plots viewed subsequently.

Note: To specify a printer language (Postscript or PCL) or a third-party package for printing plots, see Section 3.2.4.16.



3.8 Using TDFs to Generate Multiple Plot Start and Stop Times

Time Definition Files (TDF) are text files that contain start and stop time pairs. These files can be used to specify start and stop times for generation of multiple plot requests.

Note: The default location for TDFs is in the property designated as “TDF Dir” on the “Tools” | “Properties” | “Paths” window.

TDF creation is enabled by the TDF Editor utility, described in Section 8.7.

To generate plots using existing TDFs:

- Follow the directions in Section 3.1 for the creation of default plots or the direction in Section 3.2 for the creation of plots with custom properties.
- Click the times-associated  icon to use an existing TDF instead of typing the plot start and stop times on the submit window (Figure 8). Alternatively, click the  icon to activate the TDF Editor (see Section 8.7).
- Select a file and click the “Open” button on the “Select TDF File” window (see Figure 43).

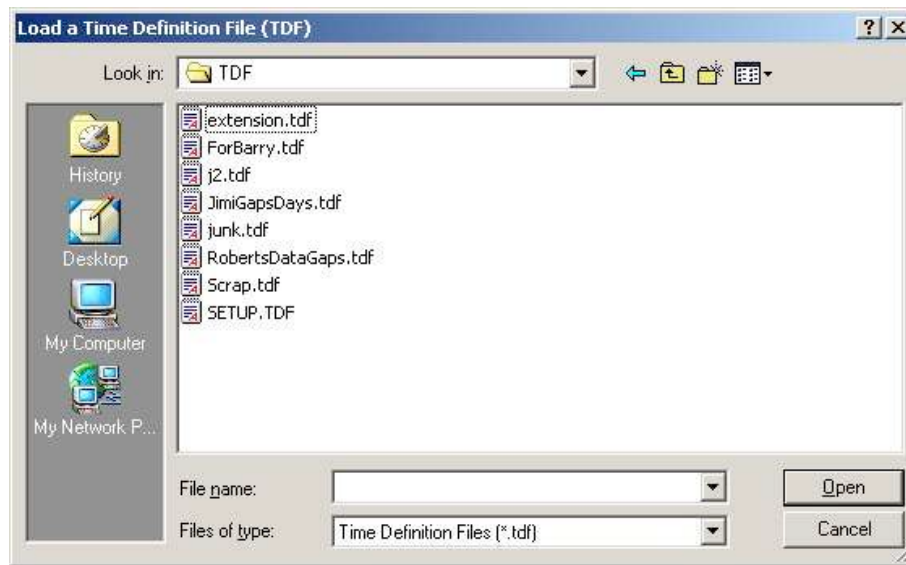


Figure 43: TDF Selection Window

- Continue the plot request process normally, as described above in Section 3.1 and Section 3.2.

Section 4 ITPS Report Generation

ITPS generates several types of data-based telemetry reports. The values in these reports are extracted from telemetry in the ITPS Archive. Users must select mnemonics for inclusion in reports by adding them to report input definition (.idf) files.

Note: See Section 9 for information on adding data to the ITPS Archive.

4.1 Report Types

ASCII Report -	Timestamped value for each requested mnemonic in the format indicated by the IDF entry (EU, RAW, decimal, hex, etc).
Mnemonic Change Report -	Contains a timestamped listing of telemetry values when the 'step' between consecutive values exceeds a predetermined threshold. The mnemonic names and threshold values are contained in the IDF used in generating the report. <i>(see Section 6 for general information on the creation of IDFs)</i>
Limit Report -	Timestamped listing of mnemonics and corresponding values, when the mnemonics transition between limit states as defined in the PDB.
Statistics Reports -	Display max, min, mean and standard deviation for each mnemonic requested.
Trip Count -	Displays mnemonics where n consecutive values pass the mnemonic filtering condition.
Trip Time -	Displays mnemonics where the filter condition is true for n seconds.

ITPS telemetry data-based reports are comma delimited. These files can be viewed using a spreadsheet program or a text editor.

4.2 IDFs for Report Generation

The process of data-based telemetry report generation is controlled via the use of an Input Definition File (IDF). Mnemonics chosen for inclusion in these types of reports must be listed in the a pre-existing IDF.

The format of the required IDF is detailed in Appendix A. IDFs should be created using the IDF Editor Utility *(see Section 6)*. IDFs generated 'by hand'

(following the syntax detailed in Appendix A) using a text editor (rather than the IDF Editor) can be verified by the use of the IDF Verify utility (see Section 8.6).

4.3 Mnemonic (ASCII) Report Generation

To generate report requests using the ITPS Main Interface:

- Select “Reports” from the ITPS Main Interface menu bar (see Figure 44).



Figure 44: Main Interface Request Reports

- Select “Request Reports” to activate the Requests screen (see Figure 45).

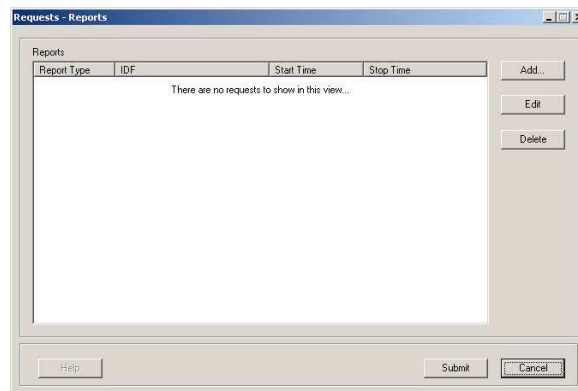


Figure 45: Report Request Screen

- Click the “Add” button to activate the Request Editor screen (see Figure 46).

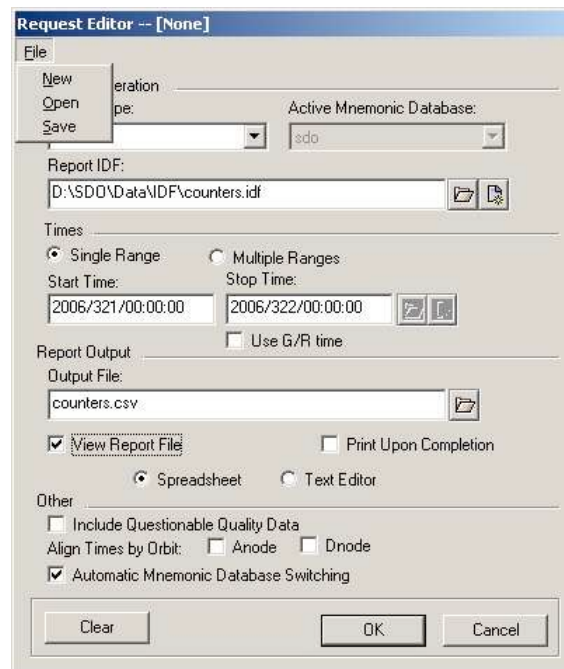






Figure 46: Request Editor Window

- Select a Report Type: ASCII.

Note: The Mnemonic Database is an ITPS internal representation of the mission PDB or ODB files. The current default Mnemonic Database name is displayed on the request screen in a 'grayed out' box. This default value may be reset prior to running requests via the Mnemonic Database management screen. See 8.1 and 8.2 to learn more about the Mnemonic Database including creating new ones. In addition this selection may be nullified by selection of Automatic Mnemonic Database Switching (below).

- Type in a file name or use the IDF file browse folder icon  to select an existing Input Definition File (IDF).
- Click the IDF editor associated  icon to edit or create an IDF (see Section 6 for a full description of the IDF Editor)

- Click the times-associated  icon to use an existing TDF instead of typing the report start and stop times on the submit window (Figure 8). Alternatively, click the  icon to activate the TDF Editor (see Section 8.7).
- Enter the “Report Start” and stop times. Optionally use a TDF (see Section 4.3.1) file of multiple grouped start and stop times.

NOTE: Missions that store telemetry by ground-receipt time (in addition to the standard spacecraft time) can choose to generate reports using ground-receipt time by checking the “Use G/R Time” box (see Figure 30). Missions without this capability will not have this option available on the request specification screen.

- Enter the Report Stop time. Report will end right before this time.
- Enter the Output File name. By default the report will be named the same as the IDF (but with a .csv extension). Selecting “spreadsheet” will allow Microsoft Excel to seamlessly import the data.

Note: The report will be placed in the directory specified in the “Tools” | “Properties” | “Paths” window.

- Check “View Report File” to view the output file as a spreadsheet or as a text file immediately upon completion of report generation.
- Check the “Include Questionable Quality Data” box to include data that failed Reed-Solomon (RS) checking or other mission specific data quality test (as appropriate per mission).
- Check “Print Upon Completion” box to send the completed report directly to the default printer upon completion of report generation.
- For missions with ITPS orbit information (see Section 9.6 for information about ITPS acquisition of this data), click the Align Times by Orbit Anode (orbit times will be from Anode start to the end of the corresponding Dnode)

or Dnode (orbit times will be from Dnode to the end of the subsequent Anode) checkbox to generate a separate report for every orbit that is between the start and start time selected.

NOTE: When only part of an orbit is between the start and stop time selected for the report, ITPS will 'expand' the report request times to include complete orbits.

NOTE: The file names of reports that are generated by 'By Orbit' will contain the requested output file name with the orbit number embedded.

- Click the “Automatic Mnemonic Database Switching” button to have ITPS determine the appropriate Mnemonic Database for use. (See Section 8.3 for information on configuring automatic database switching.)

NOTE: This determination is based on the times in the selected request, and the Mnemonic Database that was in effect when the spacecraft data was generated. See Section 8.1 for more on selecting Mnemonic Databases.

- Click the “OK” button to add the report request to the report queue.
- Click the “Submit” button on the Report Request screen (see Figure 45) to begin running the reports in the report queue.

Below are sample report segments of a Mnemonic (ASCII) report.



Year	S/C Time	A+AC01A	A+AC01A	FHPWA	FHPWB	FHS1	FHS2	FHS3	FHS4	FIPWA	FIPWB	FKTMOTBF	FKTMOTBT	FSCADCD	FSCBHT	FSCBUK
2003	024-00:00:39.734					0	0	0	1	0.691058		48128	1.42E+09	0	36.27008	108.796
2003	024-00:00:45.354			1	0											
2003	024-00:00:46.291															
2003	024-00:00:52.849	5.049455	202													
2003	024-00:00:54.722					1	0	0	0			47360	1.42E+09	0	36.27008	111.326
2003	024-00:01:00.343			1	0					0.691058						
2003	024-00:01:01.280															
2003	024-00:01:07.837	5.049455	202													
2003	024-00:01:09.710					0	1	0	0			46592	1.42E+09	0	36.27008	111.326

Figure 47: ASCII Formatted Mnemonic Report Excel Sample

4.3.1 Using TDFs to Enter Multiple Report Start and Stop Times

Time Definition Files (TDF) are text files that contain start and stop time pairs. These files can be used to specify start and stop times for generation of multiple products (reports or plots). The TDF Editor utility is described in Section 8.7.

To generate reports using TDFs:

- Select “Reports” from the ITPS Main Interface menu bar (see Figure 44).
- Select “Request Reports” to activate the Requests screen (see Figure 45).
- Click the “Add” button to activate the Request Editor screen (see Figure 46).
- Select a Report Type.
- Select an IDF as described in Section 4.3.
- Click the times-associated  icon to select a pre-existing TDF or time-associated  icon to activate the TDF Editor (see Section 4.3.1).
- Select a file and click the “Open” button on the “Select TDF File”.
- Continue the report request process normally, as described above in the Section 4.3.

4.3.2 Monitoring Submitted Report Requests

Once report jobs have been submitted, they can be viewed (or deleted) in the Request Viewer window. See Section 2.3 for Request Viewer window uses and instructions.

4.3.3 Saving and Loading Saved Report Requests

Users have the option of saving and then reloading requests for reports through the Request Editor window. In this manner, routine report requests can be easily processed without having to re-specify the Report Type, IDF Name, Start Time, Stop Time, and Output File name.

To Save the Current Request:

- Follow directions for creating a new report request in the Section 4.3.
- Click the “File” option in the upper left hand corner of the “Request Edit” window (*Figure 48*).
- Select the “Save” option (see *Figure 48*) and choose an output filename.

Note: All of the request file names will automatically be assigned an extension of .req.

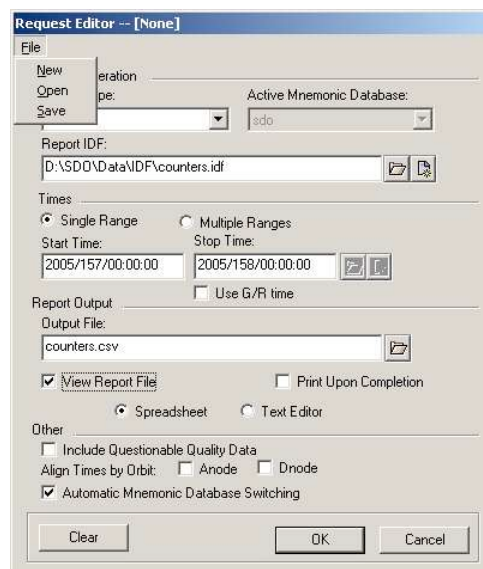


Figure 48: Request Editor New/Open/Save Screen

To Load a Saved Request:

- Choose the “Reports” menu item from the ITPS Main Interface menu bar.
- Select Request Reports to bring up the Report Request screen (see *Figure 45*).
- Click “Add” to activate the Request Editor screen (See *Figure 46*).
- Click the “File” option in the upper left hand corner of the “Request Edit” window .
- Select the “Open” option (see *Figure 48*) and select the request file to load.

Note: The file selection box will display the files with a .req. extension in the default directory. The default directory is set by selecting “Tools” | “Properties” | “Paths” from the ITPS Main Interface.

4.4 Mnemonic Change (Delta) Report

ITPS provides the ability to generate Mnemonic Change (also known as delta) reports. Mnemonic Change reports contain a timestamped listing of telemetry values when the ‘step’ or delta between consecutive values exceeds a predetermined threshold. The user can choose to select from PDB (or ODB) specified delta limits (for missions whose PDB or ODB contain delta limits), or the user can enter the values using the IDF editor (see *Section 6 for general information on the creation of IDFs*).

To create a Mnemonic Change Report:

- Select “Reports” from the ITPS Main Interface menu bar (see *Figure 44*).
- Select “Request Reports” to activate the Requests screen (see *Figure 45*).
- Click the “Add” button to activate the Request Editor screen (see *Figure 46*).
- Select a Mnemonic Change (MNCHANGE) report from the ITPS Request Editor window (see *Figure 49*).

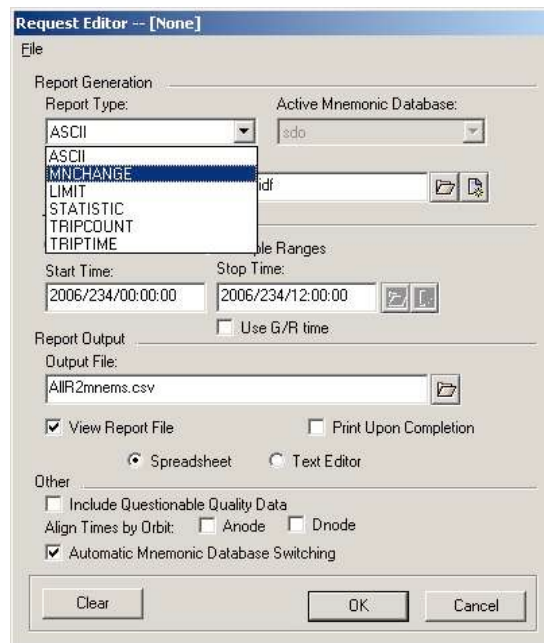



Figure 49: Request Editor Window

- Type an IDF name in the IDF selection area of the Request Editor window or click the IDF Editor  icon to edit or create an IDF (see Section 6 for a full description of the IDF Editor).
- Follow directions in Section 6.7.4 to select a Mnemonic Change report threshold value.
- Continue with the report generation process as described in Section 4.3 to generate a Mnemonic Change report (see sample report Figure 50).

1	Mnemonic Change Report									
2	Input Definition File: D:\LTAS\Data\IDF\TelemModes.idf									
3	Today's Date: 8/7/2003									
4	This DMB file was used: d:\ltas\data\dmdb\Complete0700WCtxtDep.dmb									
5	These LA files were used: D:\LTAS\Archive\LA2003015.S000 D:\LTAS\Archive\LA2003016.S000									
6	Decom Start Time: 2003/015/12:00:00									
7	Decom Stop Time: 2003/016/00:00:00									
8										
9										
10	year	time	mnemonic	(per IDF) value	RAW/EU flag	discrete state units	description	data screening expression	orbital instruction	mnemonic description
12	2003	015-13-34:30:658	TDTLMMODE	4	EU		EXT_FSW			TDF Telemetry Mode
13	2003	015-13-34:31:658	TDTLMMODE	6	EU		DMP_TDF			TDF Telemetry Mode
15	2003	015-13-34:30:658	TDTLMPRSET	0	EU		RAM			Telemetry Preset/Modified (PROM/RAM)
16	2003	015-13-34:31:658	TDTLMPRSET	1	EU		PROM			Telemetry Preset/Modified (PROM/RAM)
18	2003	015-13-34:31:658	TDTLMMODE	6	EU		DMP_TDF			TDF Telemetry Mode
19	2003	015-13-34:37:658	TDTLMMODE	4	EU		EXT_FSW			TDF Telemetry Mode
21	2003	015-13-34:31:658	TDTLMPRSET	1	EU		PROM			Telemetry Preset/Modified (PROM/RAM)
22	2003	015-13-34:37:658	TDTLMPRSET	0	EU		RAM			Telemetry Preset/Modified (PROM/RAM)

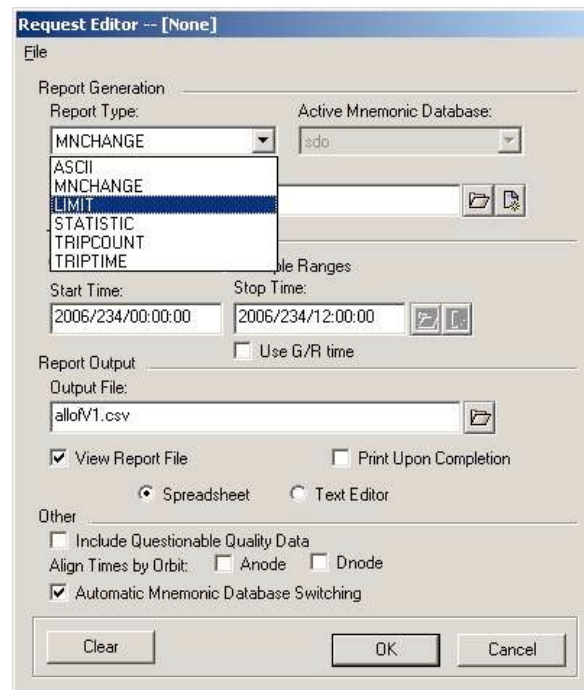
Figure 50: Excerpt of Mnemonic Change Report

4.5 Limit Report

Limit Reports contain timestamped mnemonic values for selected mnemonics only when those mnemonics violate a red or yellow high or low limit (see Figure 52). The Limit Report selection is based on the limit values contained in the ITPS Mnemonic Database. The Mnemonic Database is in turn generated from mission PDB (or ODB) files (see Section 8.2 for more on the creation of the Mnemonic Database).

To create an ITPS Limit Report:

- Select “Reports” from the ITPS Main Interface menu bar (see Figure 44).
- Select “Request Reports” to activate the Requests screen (see Figure 45).
- Click the “Add” button to activate the Request Editor screen (see Figure 46).
- Select Limit (LIMIT) report from the ITPS Request Editor window (see Figure 51).



Request Editor -- [None]

File

Report Generation

Report Type: **MNCHANGE** (dropdown menu open showing: ASCII, MNCHANGE, **LIMIT**, STATISTIC, TRIPCOUNT, TRIPTIME)

Active Mnemonic Database: **ado** (dropdown menu)

Start Time: **2006/234/00:00:00** Stop Time: **2006/234/12:00:00**

Report Output

Output File: **allof1.csv**

☒ View Report File ☐ Print Upon Completion

☒ Spreadsheet ☐ Text Editor

Other

☐ Include Questionable Quality Data

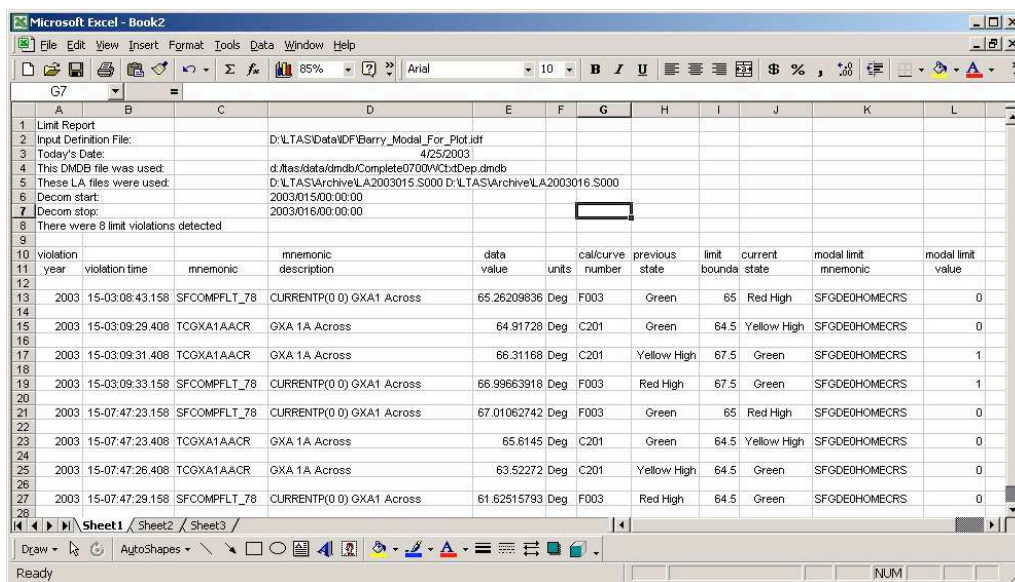
Align Times by Orbit: ☐ Anode ☐ Dnode

☒ Automatic Mnemonic Database Switching

Clear OK Cancel

Figure 51: Limit Report Request

- Continue with the report generation process as described in Section 4.3.



violation year	violation time	mnemonic	mnemonic description	data value	units	cal/curve number	previous state	limit bounds	current state	modal limit mnemonic	modal limit value
2003	15-03:08:43.158	SFCOMPFLT_78	CURRENTP(0 0) GXA1 Across	65.26209836	Deg	F003	Green	65	Red High	SFGDEOHOMECRS	0
2003	15-03:09:29.408	TCGXA1AACR	GXA 1A Across	64.91728	Deg	C201	Green	64.5	Yellow High	SFGDEOHOMECRS	0
2003	15-03:09:31.408	TCGXA1AACR	GXA 1A Across	66.31168	Deg	C201	Yellow High	67.5	Green	SFGDEOHOMECRS	1
2003	15-03:09:33.158	SFCOMPFLT_78	CURRENTP(0 0) GXA1 Across	66.99663918	Deg	F003	Red High	67.5	Green	SFGDEOHOMECRS	1
2003	15-07:47:23.158	SFCOMPFLT_78	CURRENTP(0 0) GXA1 Across	67.01062742	Deg	F003	Green	65	Red High	SFGDEOHOMECRS	0
2003	15-07:47:23.408	TCGXA1AACR	GXA 1A Across	65.6145	Deg	C201	Green	64.5	Yellow High	SFGDEOHOMECRS	0
2003	15-07:47:26.408	TCGXA1AACR	GXA 1A Across	63.52272	Deg	C201	Yellow High	64.5	Green	SFGDEOHOMECRS	0
2003	15-07:47:29.158	SFCOMPFLT_78	CURRENTP(0 0) GXA1 Across	61.62515793	Deg	F003	Red High	64.5	Green	SFGDEOHOMECRS	0

Figure 52: Sample Limit Report

4.6 Statistics Report

ITPS Statistics Reports display the maximum, minimum, mean, standard deviation and number of points of selected mnemonics over a time span.

To generate a Statistics Report:

- Select “Reports” from the ITPS Main Interface menu bar (see *Figure 44*).
- Select “Request Reports” to activate the Requests screen (see *Figure 45*).
- Click the “Add” button to activate the Request Editor screen (see *Figure 46*).
- Select Statistics (STATISTICS) report from the ITPS Request Editor window (see *Figure 53*).

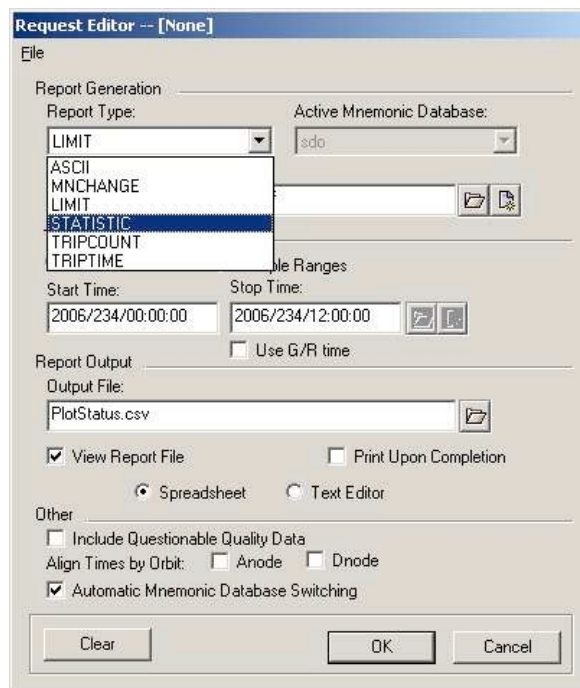


Figure 53: Statistics Report Request

- Continue with the report generation process as described in Section 4.3 to create the Statistics Report (see *Figure 54*).

Microsoft Excel - StatReport.csv

File Edit View Insert Format Tools Data Window Help

1 Statistics Report
 2 Input Definition File: D:\SOHO\Data\idf\TestPlot.idf
 3 Report Date: 11/19/2003
 4 DMDb file(s): d:\SOHO\data\dmdb\soho.dmdb
 5 Decom start: 2003/02/04 00:00:00
 6 Decom stop: 2003/02/04 01:00:00

Mnemonic	Mean Value	Minimum	Maximum	Standard Dev	Frequency	Screening Logic	Orbital Parameter	Number Of Data Points	First Sample Start Year	First Sample Start Time	Last Sample Stop Year	Last Sample Stop Time
A+AC01A	5.049455	5.049455	5.049455	0	0			237	2003	024-00:00:52.849	2003	024-00:59:50.083
A+AC01A	202	202	202	0	0			237	2003	024-00:00:52.849	2003	024-00:59:50.083
FHPWA	1	1	1	0	0			238	2003	024-00:00:45.354	2003	024-00:59:57.577
FHPWB	0	0	0	0	0			238	2003	024-00:00:45.354	2003	024-00:59:57.577
FHS1	0.252101	0	1	0.435134	0			238	2003	024-00:00:39.734	2003	024-00:59:51.957
FHS2	0.247899	0	1	0.432703	0			238	2003	024-00:00:39.734	2003	024-00:59:51.957
FHS3	0.247899	0	1	0.432703	0			238	2003	024-00:00:39.734	2003	024-00:59:51.957
FHS4	0.252101	0	1	0.435134	0			238	2003	024-00:00:39.734	2003	024-00:59:51.957
FIPWA	0.694842	0.677098	0.712	0.005071	0			238	2003	024-00:00:45.354	2003	024-00:59:57.577
FIPWB					0			0				
FKTMOBTF	30916.8403	0	65280	18519.931	0			238	2003	024-00:00:39.734	2003	024-00:59:51.957
FKTMOBTS	1422059415	1422057639	1422061191	1031.4704	0			238	2003	024-00:00:39.734	2003	024-00:59:51.957
FSCADCD	0	0	0	0	0			238	2003	024-00:00:39.734	2003	024-00:59:51.957
FSCBHT	36.270081	36.270081	36.270081	0	0			238	2003	024-00:00:39.734	2003	024-00:59:51.957
FSCBUC	110.424988	108.798433	113.858826	1.400801	0			238	2003	024-00:00:39.734	2003	024-00:59:51.957

Figure 54: ITPS Statistics Report

4.7 Trip Count Report

On occasion it is useful to filter data based not only on a logical filtering condition, but also on the selected condition being true for a specified number of consecutive points. The Trip Count report allows users to set a filtering condition and to designate a “trip” number for each mnemonic in an IDF, so that values are displayed only when the filtering condition is true for (at least) the “trip” number of consecutive points.

To generate a Trip Count Report:

- Select “Reports” from the ITPS Main Interface menu bar (see Figure 44).
- Select “Request Reports” to activate the Requests screen (see Figure 45).
- Click the “Add” button to activate the Request Editor screen (see Figure 46).
- Select Trip Count (TRIPCOUN) report from the ITPS Request Editor window.
- Select an existing IDF or create a new one. Set the filter condition as needed (see Section 6.7.1).
- Set the “Trip” setting to the minimum number of consecutive values (whose filter evaluates to ‘true’) (see Section 6.7.8).

4.8 Trip Time Report

The Trip Time Report provides the capability to filter data based not only on a logical filtering condition, but also on the selected condition being true for a specified number of seconds, so that values are displayed only when the filtering condition is true for (at least) the “trip” number of seconds.

To generate a Trip Time Report:

- Select “Reports” from the ITPS Main Interface menu bar (*see Figure 44*).
- Select “Request Reports” to activate the Requests screen (*see Figure 45*).
- Click the “Add” button to activate the Request Editor screen (*see Figure 46*).
- Select Trip Time (TRIPTIME) report from the ITPS Request Editor window.
- Select an existing IDF or create a new one. Set the filter condition as needed (*see Section 6.7.1*).
- Set the Trip setting to the minimum number of seconds (whose filter evaluates to ‘true’) (*see Section 6.7.8*).

Section 5 ITPS Lifetime Trend (LTT) Data

ITPS stores reduced resolution telemetry in the form of statistics of telemetry data (extracted from the ITPS Archive) for use in long term trending in the ITPS Lifetime Trend (LTT) database. The LTT can contain daily, hourly, and (for missions for which ITPS has orbit information) by-orbit mnemonics statistics.

The LTT database is designed to store for each mnemonic a single set of statistics per day, hour and orbit. Adding mnemonic data to the LTT for a day, hour or orbit that is already in the LTT will result in the earlier statistical data being overwritten. For purposes of the LTT, a mnemonic is defined (as contained in the LTT IDF file):

`Mnemonic + Sampling + OrbitFilter + Filtering Logic + TimeStamp Choice`

It is therefore possible to add a mnemonic to the LTT multiple times (for a single day, hour or orbit) as long as the sampling frequency, orbit filter parameter, filtering logic or spacecraft/ground-receipt time choice (for missions that store data by optional ground-receipt time) is different. See Section 6.7 for more on setting these parameters.

For each mnemonic, the LTT contains (for each day, hour or orbit):

- Mnemonic max
- Mnemonic min
- Mnemonic mean
- Standard deviation.
- Number of data points (for day, hour or orbit).

These LTT parameters can be extracted via LTT Reports or Plots (see *Section 5.2*).


5.1 Adding Data Points to Lifetime Trend (LTT) Data

To add data points to the LTT database:

- Select “Lifetime Trend” from the ITPS Main Interface menu bar and choose “Add Mnemonics” from the pull-down menu to activate the LTT submission window (see *Figure 55*).



Figure 55: Lifetime Trend Menu Selections

- Click the “Add” button on the “Add Mnemonic to Lifetime Trend” submit screen.
- Click the file folder icon  to select an Input Definition File (IDF) on the Request Editor screen (see Figure 56).

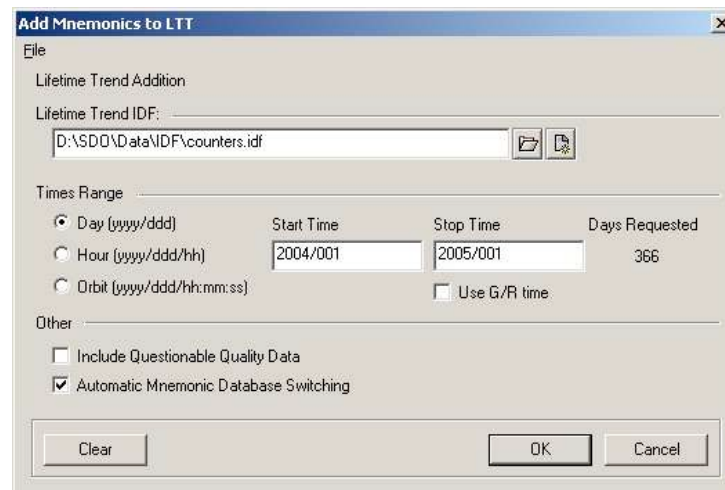



Figure 56: LTT Request Editor Screen

- Click the IDF Editor  icon to edit or create an IDF (see Section 6 for a full description of the IDF Editor).
- Select the LTT job “Time Range”: Day, Hour, or Orbit (for missions that for which ITPS uses mission orbital data).

NOTE: Missions that store telemetry by ground-receipt time (in addition to the standard spacecraft time) can choose to add and extract LTT data using ground-receipt time by checking the "Use G/R Time" box (see Figure 8). Missions without this capability will not have this option available on the request specification screen.

- Enter the job start time in the appropriate format (see Figure 56 for time formats). For Orbit LTT requests, select the times roughly corresponding to the orbit start and stop times.

NOTE: When only part of an orbit is between the start and stop time selected for the report, ITPS will 'expand' the report request times to include complete orbits.

- Enter the job stop time.

Note: The "Days/Hour Requested" counter indicates the number of elements in the extraction range represented by the start and stop times. For example, to add data to the LTT for a single day the Stop time must be set to the Start day +1.

- Check the "Include Questionable Quality Data" box to include data that has been flagged as questionable (for missions where this is applicable).
- Click the "Automatic Mnemonic Database Switching" button to have ITPS determine the appropriate Mnemonic Database for use. (See Section 8.2 for information on configuring automatic database switching.)

Note: The Mnemonic Database is an ITPS internal representation of the MOC PDB files. By Default ITPS will select the appropriate Mnemonic Database based on the request Start Time and request Stop Time. Un-clicking the “Automatic Mnemonic Database Switching” button will cause ITPS to use the default Mnemonic Database. To change to another Mnemonic Database see Sections 8.1 and 8.2.

- Click “OK” to add the LTT data addition request to the submit screen.
- Click “Submit” to begin running the listed requests in the request queue.



Requests may be saved and restored by using the “Open” and “Save” options on the LTT Request Editor “File” menu item.

Once LTT data addition requests are submitted, they are added to the ITPS request queue. These jobs may be monitored, reordered and deleted using the Request Viewer screen. (See Section 4.3.2.)

5.2 Extracting Selected Lifetime Trend Data

LTT data can be extracted from the LTT data for examination in a text file, spreadsheet or plot.

To extract LTT data:

- Select “Extract Lifetime Trend Data” from the ITPS Main Interface Lifetime Trend menu option (see Figure 62).
- Type the file name of an existing IDF or click the file folder icon  to select an Input Definition File (IDF) on the Request Editor screen (see Figure 57).
- Click the IDF Editor  icon to edit or create an IDF (see Section 5.3 for a full description of the IDF Editor).
- Select the extraction type – Day, Hour or by Orbit.
- Enter the extraction start and stop time range or orbit range for which to extract mnemonic statistics from the LTT.

NOTE: Data that was added by optional ground-receipt (G/R) time (for missions where ground-receipt time is supported) can extract LTT data by ground-receipt time. Missions without this capability will not have this option available on the extraction specification screen.

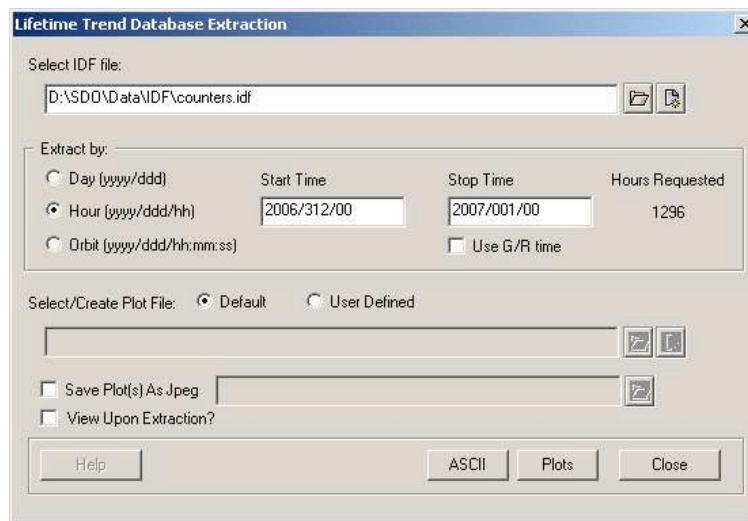


Figure 57: LTT Database Extraction Window

- Click “Plots” to extract the data to plot (see Figure 58), click “ASCII” to extract the data to a text file.

Note: Since LTT extractions are often wider than 255 columns; the ASCII data is displayed in a text editor. Users can selectively copy data to other applications such as MS Excel or Kaleidagraph.

- If extracting to a plot, select “Default” or “User Specified” plot definition file. See Section 3.3 for plot customization options.

Note: IDFs used for extraction of LTT data control which statistics are to be plotted (MIN, MEAN, MAX, ST DEV, NUM

PTS). ITPS will display a line on the plot page for each statistical value selected. Thus, each mnemonic plotted will create n lines (where n is the total number of statistics selected for the mnemonic).

The total number of lines per plot page may be no more than 16. As a result attempts to use IDFs that contain more than 16 lines per page for LTT plotting will result in an error.

- Once the LTT data extraction request is submitted, it is added to the ITPS request queue. These jobs may be monitored, reordered and deleted using the Request Viewer screen. (See Section 4.3.2).
- Mark the View Upon Extraction check box to automatically activate the display of the generated product upon completion of the extraction *Figure 57*.

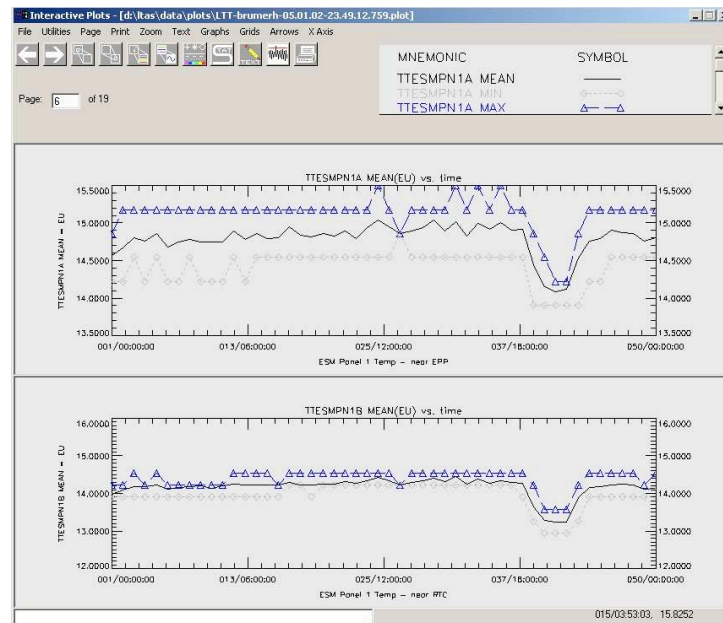


Figure 58: Plot Daily Lifetime Trend data

5.3 LTT Digest

To determine if the LTT archive is being populated as expected, users can use the LTT Digest utility. This utility displays the percent complete of the daily, hourly and by-orbit LTT archive. The percent complete is based on the number of mnemonics in the LTT, vs. the number of mnemonics in the mission mnemonics database at the time when the LTT data is generated.

To activate the LTT Digest utility:

- Select one of the LTT Digest options from the ITPS main menu (see *Figure 59*).

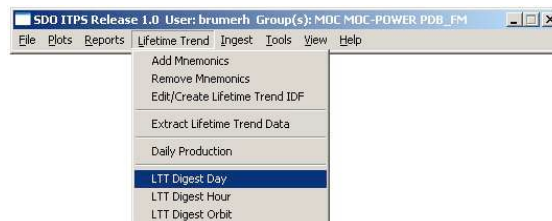


Figure 59 LTT Digest Selection

- Move the mouse over the day-of-year indicator boxes to see the percentage completion data in the LTT Digest status bar window (*Figure 60*).
- Double-click on any day box to drill down and display the daily, hourly or by-orbit LTT details.

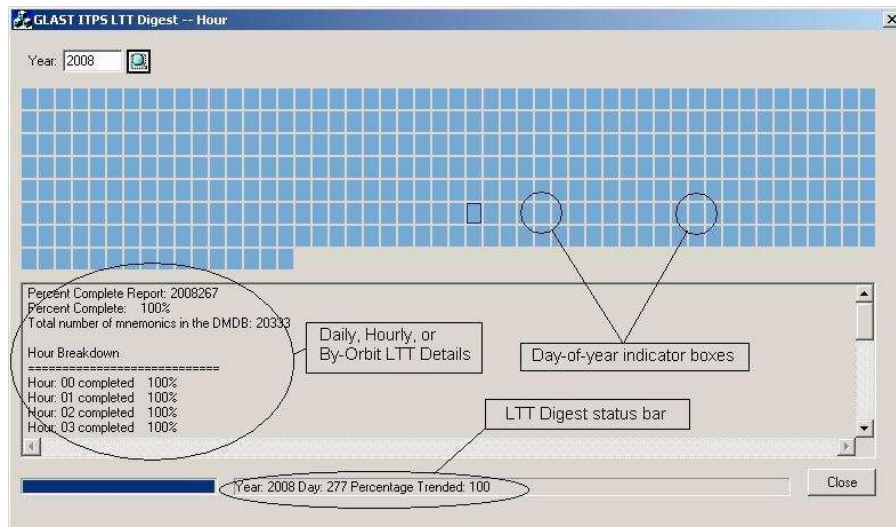



Figure 60 LTT Digest Window

Days that have 100% of mnemonics (of the type being displayed) in the LTT are displayed in blue.

Days that have some LTT data but less than 100% are marked in yellow.

Days that have no LTT data (of the type being displayed) are marked in red.

If no data is data about the LTT is available the boxes are displayed in dark gray.

- Change the LTT Digest display year in the Digest display window (*Figure 117*) and click the  icon to begin rescanning the archive for a different year.
- Click “Close” to exit the LTT Digest window.



5.4 Edit/Create Lifetime Trend IDF

The IDF Editor creates Input Definition Files for use in during LTT extraction. A shortcut to this utility is provided on the Lifetime Trend menu (*Figure 55*). The tool will not be described here - a full description is provided in Section 6.

5.5 Removing LTT Data

Data stored in the LTT may be selectively purged from the database. The removal of data from the LTT is done based on a mnemonic name (the user of mnemonic names in relation to LTT is described in the introduction to Section 4) Once a mnemonic is removed from the LTT, all of the related values are deleted – regardless of which IDF was used to add them to the LTT, for hourly, daily and by-orbit and for the entire mission lifespan.

To delete a group of mnemonics from the LTT database:

- Select “Remove Mnemonics” from the ITPS Lifetime Trend menu bar.
- Type the name of an existing IDF or click the file folder icon  to select an Input Definition File (IDF) on the LTT Remove Mnemonics screen (*see Figure 61*).
- Click the IDF Editor  icon to edit or create an IDF (*see 5.3 for a full description of the IDF Editor*)

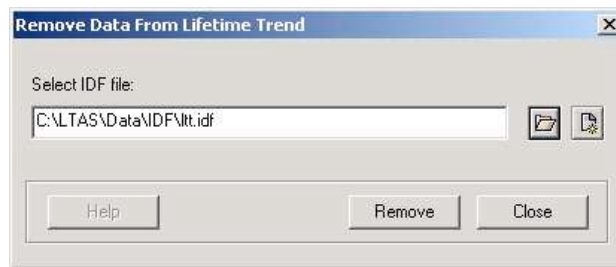


Figure 61: LTT Remove Mnemonics Screen

- Click “Remove” to remove all instances of the mnemonic from the LTT database.

NOTE: When mnemonic data is removed from the LTT database, EVERY instance (daily, hourly and orbit) of the mnemonic is removed regardless of what IDF was used to add the mnemonics to the LTT. Data removed from the LTT database is not recoverable.

Section 6 IDF Editor

ITPS Input Definition Files (IDFs) contain selected mnemonics (including pseudo-mnemonics), filtering information, and output formats, and are used in the generation of ITPS data-based products. The IDF Editor utility provides the capability to create these files.

6.1 Starting IDF Editor

Since IDFs are required for the generation of several ITPS products, access to the IDF Editor is available for each of the ITPS components that require them.

To generate an IDF for plot generation:

- Select “Plots” | “Edit/Create Plot IDF” from the ITPS Main Interface screen (*Figure 62*).



Figure 62: ITPS Plot IDF Menu Selection

To generate an IDF for report generation:

- Select “Reports” | “Edit/Create Report IDF” from the ITPS Main Interface screen (*Figure 63*).




Figure 63: ITPS Report IDF Menu Selection

To generate an IDF for LTT data generation:

- Select “Lifetime Trend” | “Edit/Create Lifetime Trend IDF” from the ITPS Main Interface screen (*Figure 64*).



Figure 64: ITPS LTT IDF Menu Selection

Note: The IDF Editor is also accessible for report generation from the Request Editor Window (see Figure 46); for plot generation from the “Plots” | “Request Plots” page), and for the LTT Request Editor Screen, (see Figure 56) by clicking on the  icon on those screens.

6.2 Selecting IDF Mnemonics

To select mnemonics for an IDF:

- Click on the mnemonics to be included in the IDF in the IDF Editor main window (see Figure 65).

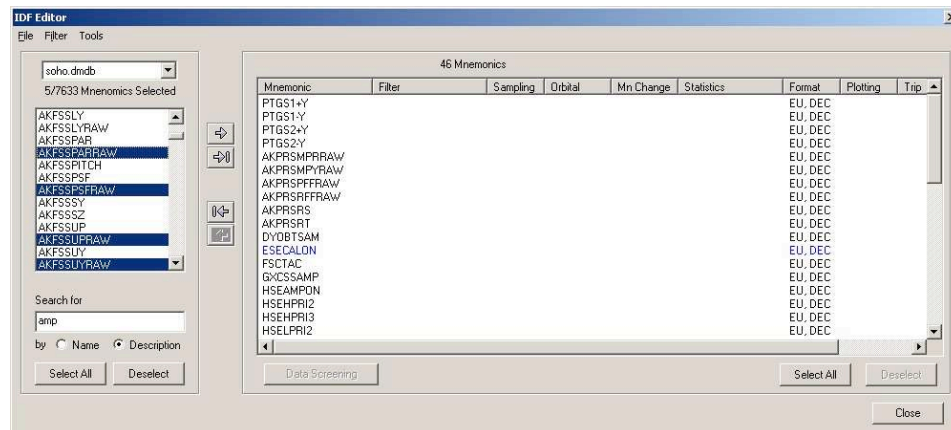




Figure 65: IDF Editor Main Window

- Click the  button to add the mnemonics to the ‘selected mnemonics’ list on the right side of the screen.

Note: To view the details available in the Mnemonic Database for any mnemonic, double-click on the mnemonic in the available mnemonic list on the left side of the IDF Editor main window.

The available mnemonic list also contains the pseudo-mnemonics created using the User Pseudos (see Section 8.4).

In addition, the available mnemonics list also contains Mnemonic Constants (as defined in the mission PDB or ODB). These mnemonics can be included in the IDF but will not result in the generation of values. Mnemonic Constants are not intended for use as stand-alone mnemonics.

- Click the  button to remove mnemonics from the selected mnemonics list on the right side of the screen.
- Highlight a mnemonic (or group of mnemonics) and drag it up or down to reorder the list of selected mnemonics.
- Save the selected mnemonics to an IDF by selecting “File” | “Save” from the IDF Editor main screen.

Note: IDF names may not contain any spaces, commas or pipe ‘|’ characters.

Note: The default directory for IDFs is designated by the “Paths” | “IDF Dir” in the ITPS Properties. See Section B.1 of Appendix B for more on ITPS Properties.

6.3 Selecting Mnemonics using Existing IDFs

To add mnemonics to a new IDF using mnemonics included in an existing IDF:

- Use the pull-down menu on the left of the IDF editor screen (see *Figure 66*) to select an existing IDF.
- Add selected mnemonics to the list of selected mnemonics.
- Choose the mission database file (*.dmdb) to restore full mission mnemonics listing to the mnemonics list window.

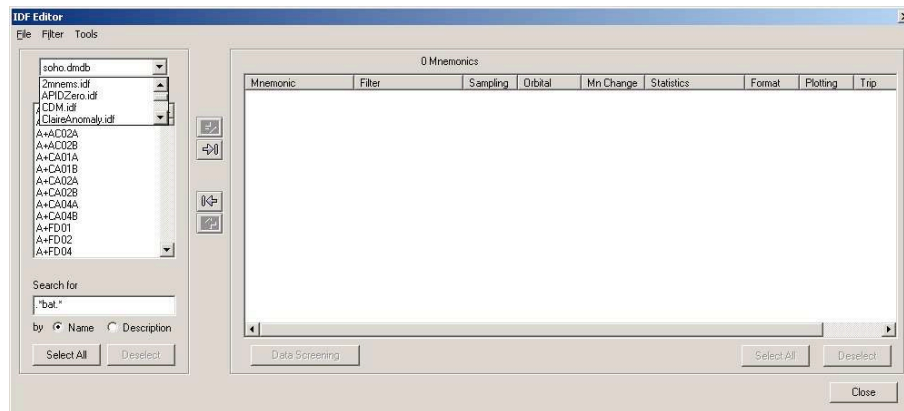


Figure 66: Using Existing IDF to Select Mnemonics

6.4 Searching for Mnemonics in IDF Editor

To search for mnemonics:

- Enter a search string in the “Search for” box on the IDF Editor main window (see *Figure 67*).

Note: Searches may be based on a sub-segment of a mnemonic name or on a sub-segment of a description. To do regular expression searching or wildcard character searching use Perl regular expression syntax (as outlined in </perl5.8.0/pod/perlre.html> at www.perldoc.com).

Some mission mnemonic names may contain ‘special’ characters such as “+” and “-“. To search for these mnemonics put a backslash character “\” before the ‘special’ character, to remove its special meaning from the search string.

- Click on “Name” to search by mnemonic Name. Click on “Description” to search by description.

Note: Mnemonic and description searches are not case-sensitive.

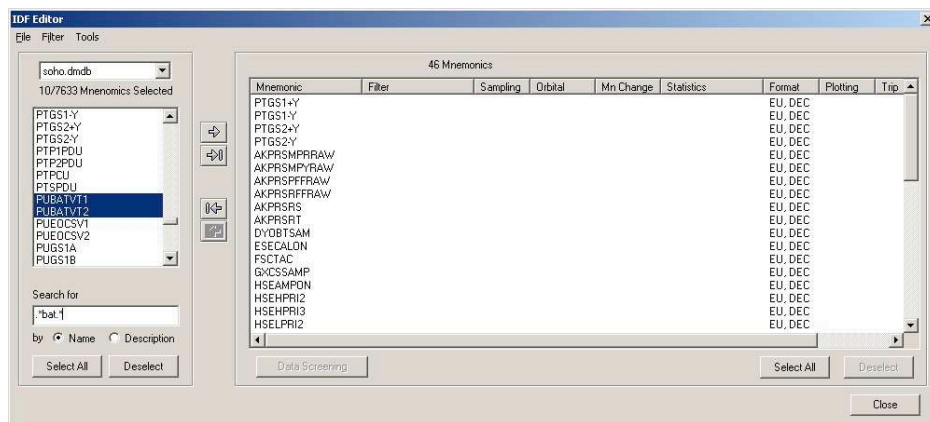


Figure 67: IDF Editor Mnemonic Search

6.5 Filtering Displayed Mnemonics in IDF Editor

The list of available mnemonics for possible inclusion in IDFs can be limited to a subset of the available mnemonics. To limit the number of mnemonics displayed:

- Select “Filter” on the IDF Editor main window (see Figure 67).
- Type the display-window filter criteria (see Figure 68).
- Click on “Name” to search by mnemonic Name. Click on “Description” to search by description.
- Click ‘OK’ to apply filter. Click ‘Cancel’ to abandon display filtering.

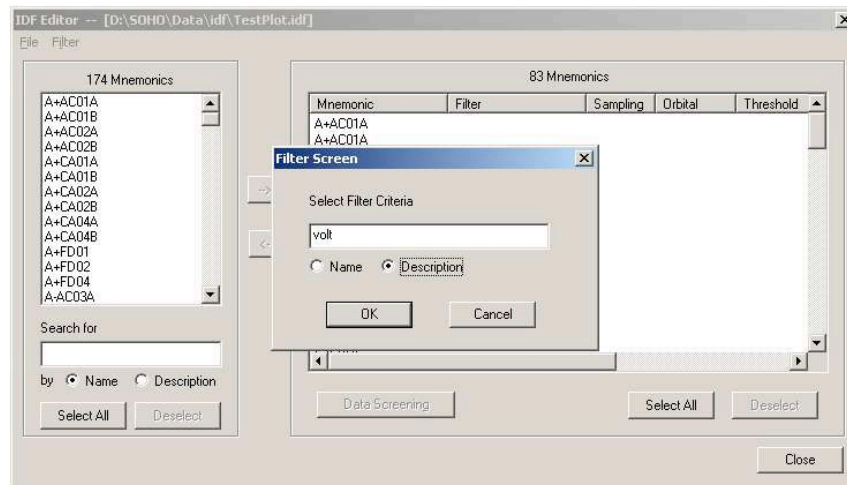


Figure 68: IDF Editor Display Filter

To re-display all mnemonics in the mnemonic selection list:

- Select “Filter” on the IDF Editor main window (see Figure 67).
- Erase the filter criteria from the filter criteria box (see Figure 68).
- Click ‘OK’ to apply filter.

6.6 Selecting Simple Plot Page and Graph Settings

To prepare an IDF file for use in printing, users must set a plot page and graph number. For plot generation with a fixed number of graphs per page (ranging from 1 to 8), select “Tools” | “Number Plots “ from the IDF Editor screen (see Figure 69). More complex page and graph settings (such as those required for mnemonic vs. mnemonic plots) are described in Section 6.7.7.1.

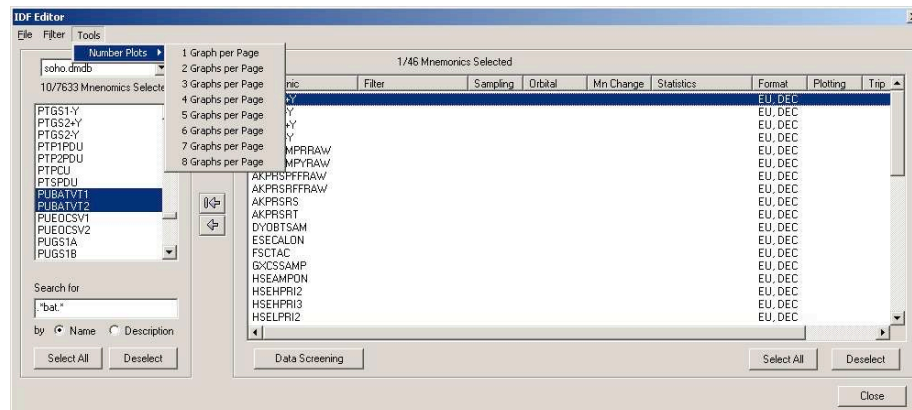


Figure 69: Plot Graphs per Page Selection

6.7 Applying Data Screening to Selected Mnemonics

Report output, LTT database input, and plot data can be customized by IDF parameters. The data screening parameters in the IDF are:

- **Filter** Mnemonic vs. mnemonic, mnemonic vs. constant, or a combination of these (see *Section 6.7.1*).
- **Sampling** Show only every nth value (see *Section 6.7.2*).
- **Orbital** Filter data based on orbit condition (see *Section 6.7.3*).
- **Mn Change** Limit extraction to mnemonic values where the 'step' (or delta) between consecutive data points exceeds selected value. Used only for Mnemonic Change Reports (see *Section 6.7.4*).
- **Statistics** Manage output of statistical values – only applicable for Statistics Reports or LTT (see *Section 6.7.5*).
- **Format** Output format (see *Section 6.7.6*).
- **Plotting** Plot page and graph selections (see *Section 6.7.7*).
- **Trip** Trip count and trip time settings (for Trip Count and Trip Time reports) (see *Section 6.7.8*).
- **Time Exp** Seconds to expand beyond filter condition (for Time Expansion Reports only) (see *Section 6.7.9*).

6.7.1 Filtering Data using IDF Filter Expressions

Filter expressions can be included in IDFs to selectively extract data from the ITPS Archive. Filtering expressions apply to all ITPS data products (plots (*Section 3*), reports (*Section 4*), LTT addition and extraction (*Section 5*)). Filter

expressions can be comprised of a combination of Conditional Telemetry Expressions. Conditional Telemetry Expressions must be in one of the formats:

- Mnemonic_A <compare> Mnemonic_B
- Mnemonic_N <compare> Number

where <compare> must be "=", "!", "<", "<=", ">" or ">=".

Conditional Telemetry Expressions may be grouped together to form complex filter expressions by the use of parentheses and the logical operators "AND" or "OR".

Note: A complex filter expression may contain up to six mnemonic names in total (where six occurrences of the same mnemonic count as six mnemonic names).

Whenever a mnemonic is used in a filter expression the value that will be evaluated will be the EU value.

To generate Data Screening Filter Expressions:

- Select mnemonics for inclusion in the IDF as described in Sections 6.1, 6.2, 6.3 and 6.5.
- Select one or more mnemonics on the right side of the IDF Editor main window (*Figure 69*).
- Click "Data Screening".
- Select the "Filter" tab from the Data Screening window (*see Figure 70*).

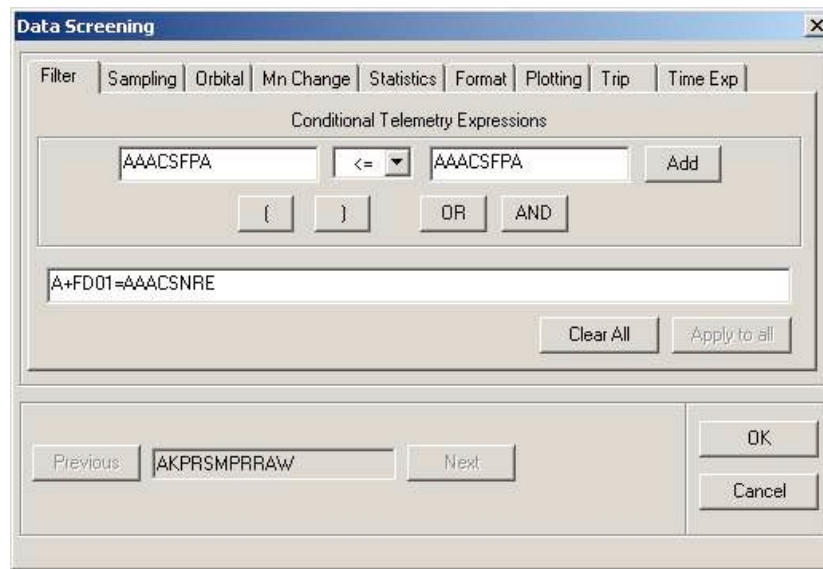


Figure 70: Data Screening- Filter Window

- Select a mnemonic for which to create a filter condition from the mnemonic name pulldown list near the bottom of the screen.

Note: Use the Previous and Next buttons to browse the selected mnemonics list.

- Enter a mnemonic name in the leftmost Conditional Telemetry Expression text box.

Note: Double-click in either of the Conditional Telemetry Expression text boxes to activate a list window of all available mnemonics.

- Choose a comparison operator from the center pulldown list.
- Enter a mnemonic name or a number in the rightmost Conditional Telemetry Expression text box.
- Click “Add” to add the Conditional Telemetry Expression to the data screening filter expression.

Note: You may click “Apply to All” to apply to all mnemonics highlighted on the IDF Editor main window.

- Click “OK” to accept the filter expression for the selected mnemonics or click another tab on the Data Screening window to continue adding other IDF data screening parameters.
- Save IDF when done.

Note: IDF file names may not contain any spaces. In addition, Windows disallows the “?”, “”, “/”, “\”, “.”, “””, “<”, “>”, and ‘|’.*

6.7.2 Sampling Data Values

The number of values displayed in a report or plot may be reduced by choosing to extract only every nth data point for a mnemonic. Data sampling applies to all ITPS data products (plots (*Section 3*), reports (*Section 4*), LTT addition and extraction (*Section 5*)).

To specify a sampling interval for a mnemonic:

- Select mnemonics for inclusion in the IDF as described in Section 6.1, 6.2, 6.3 and 6.5.
- Select one or more mnemonics on the right side of the IDF Editor main window.
- Click “Data Screening”.
- Select the “Sampling” tab from the Data Screening window (*see Figure 71*).

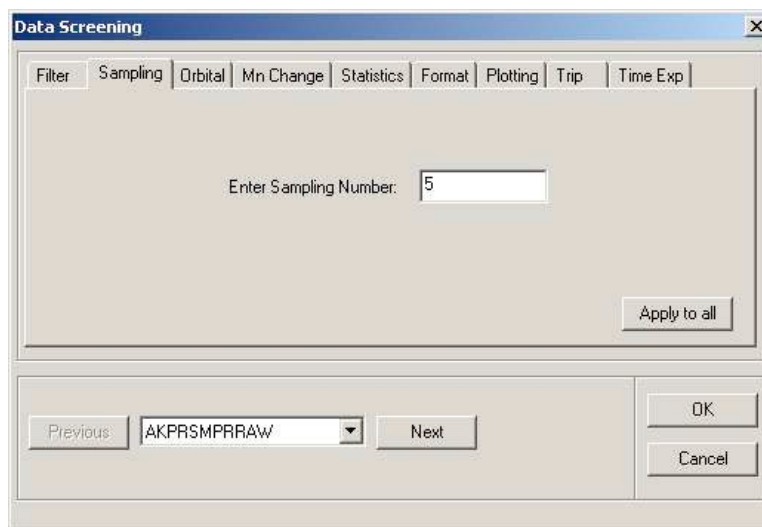


Figure 71: Data Screening Sampling Selection

- Select a mnemonic from the mnemonic name pulldown list near the bottom of the screen.
- Enter a number as a sampling interval.

Note: You may click “Apply to All” to apply to all mnemonics highlighted on the IDF Editor main window.

- Click “OK” to accept the sampling interval for the selected mnemonics or click another tab on the Data Screening window to continue adding other IDF data screening parameters.
- Save IDF when done.

6.7.3 Orbital Condition Data Screening

Some missions have spacecraft orbit information that can be examined in conjunction with telemetry values to selectively extract data for the ITPS Archive (see *Section 9.6 for information about ITPS acquisition of this data*). When indicated in the IDF, only data collected during specified orbit conditions will be used. Orbital condition screening applies to all ITPS data products (plots (*Section 3*), reports (*Section 4*), LTT addition and extraction (*Section 5*)).

To specify orbital conditions for use in data screening:

- Select mnemonics for inclusion in the IDF as described in *Section 6.1, 6.2, 6.3 and 6.5*.
- Select one or more mnemonics on the right side of the IDF Editor main window.
- Click “Data Screening”.
- Select the “Orbital” tab from the Data Screening window (see *Figure 72*).

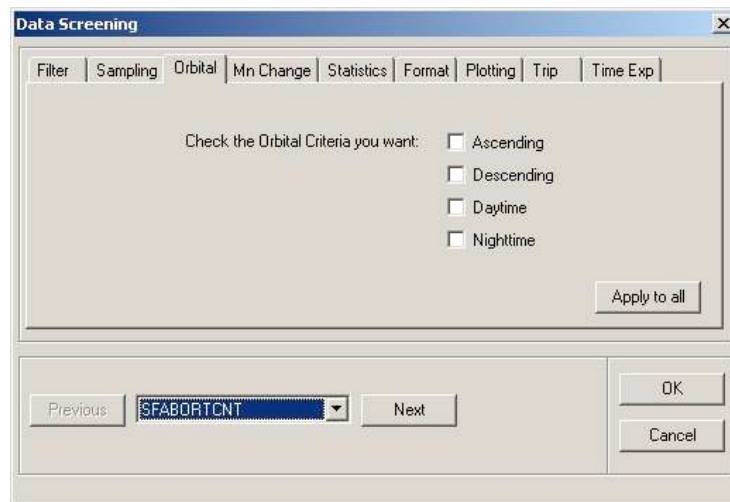


Figure 72: Data Screening Orbital Criteria

- Select a mnemonic for which to invoke orbital filtering criteria.
- Check the boxes alongside the required orbital criteria.

Note: You may click “Apply to All” to apply to all mnemonics highlighted on the IDF Editor main window.

- Click “OK” to accept the orbital filter condition for the selected mnemonics or click another tab on the Data Screening window to continue adding other IDF data screening parameters.
- Save IDF when done.

6.7.4 Specifying Threshold Screening Value

ITPS Mnemonic Change Report (see *Section 4.4*) identifies mission telemetry values when the ‘jump’ (or delta) in values between two consecutive data points exceeds a specified threshold. Threshold filtering applies to Mnemonic Change Reports (see *Section 4.4*) exclusively.

To specify a threshold value for a Mnemonic Change Report mnemonic:

- Select mnemonics for inclusion in the IDF as described in Section 6.1, 6.2, 6.3 and 6.5.
- Select one or more mnemonics on the right side of the IDF Editor main window.

- Click the “Data Screening” button.
- Select the “Mn Change” tab from the Data Screening window (see Figure 73).

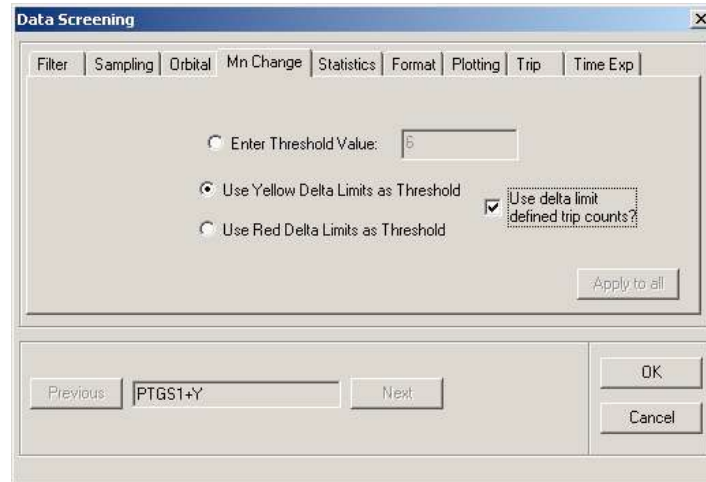


Figure 73: Data Screening Threshold Specification

- Select a mnemonic from the mnemonic name pulldown list.
- Enter a threshold value or choose to use the mission Yellow Delta or Red Delta limits as specified in the mission database (for missions that have delta limits specified in their telemetry database). If using mission yellow or red delta limits, click and select to use mission database specified delta limit trip counts (should they apply).

Note: You may click “Apply to All” to apply the threshold value to all mnemonics highlighted on the IDF Editor main window.

- Click “OK” to accept the threshold value for the selected mnemonics or click another tab on the Data Screening window to continue adding other IDF data screening parameters.
- Save IDF when done.

6.7.5 Requesting Statistics in IDF

Use the IDF statistics settings to select statistics for Statistics Reports (see Section 4.6) or when adding and extracting statistics to and from the LTT database (Section 5).

By default the Statistics Report, LTT additions and extractions will contain mnemonic max, min, mean and standard deviation and number of points – even when none of the statistics are selected in the IDF. Users can override these defaults by specifying statistical values to be generated or added. If any of the statistics are explicitly selected, then only that statistic will be generated.

Statistic filtering applies only to Statistic Reports and to LTT addition and extraction.

To override the default statistic generation parameters:

- Select mnemonics for inclusion in the IDF as described in Section 6.1, 6.2, 6.3 and 6.5.
- Select one or more mnemonics on the right side of the IDF Editor main window.
- Click “Data Screening”.
- Select the “Statistics” tab from the Data Screening window (see Figure 74).

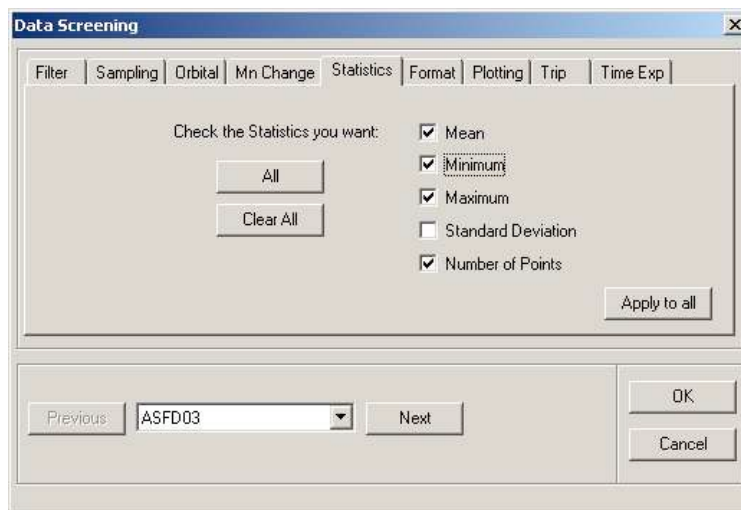


Figure 74: Statistics Criteria Screen

- Check the boxes for requested statistics.

Note: You may click “Apply to All” to apply to all mnemonics highlighted on the IDF Editor main window.

- Click “OK” to accept the statistics choice for the selected mnemonics or click another tab on the Data Screening window to continue adding other IDF data screening parameters.
- Save IDF when done.

6.7.6 Specifying Output Format

By default mnemonic data values contained in ITPS reports and plots are displayed in engineering units, decimal. Users can select data to be output in RAW format as either decimal, binary or hex.

Alternate output formats such as RAW, HEX or Discrete (the discrete state label instead of the numeric value for discrete state mnemonics) can be applied to all ITPS data reports. See the Data Screening selection screen (Figure 75) for plotting and report options.

To specify an alternate output format:

- Select mnemonics for inclusion in the IDF as described in Section 6.1, 6.2, 6.3 and 6.5.
- Select one or more mnemonics on the right side of the IDF Editor main window.
- Click “Data Screening”.
- Select the “Format” tab from the Data Screening window (see Figure 75)

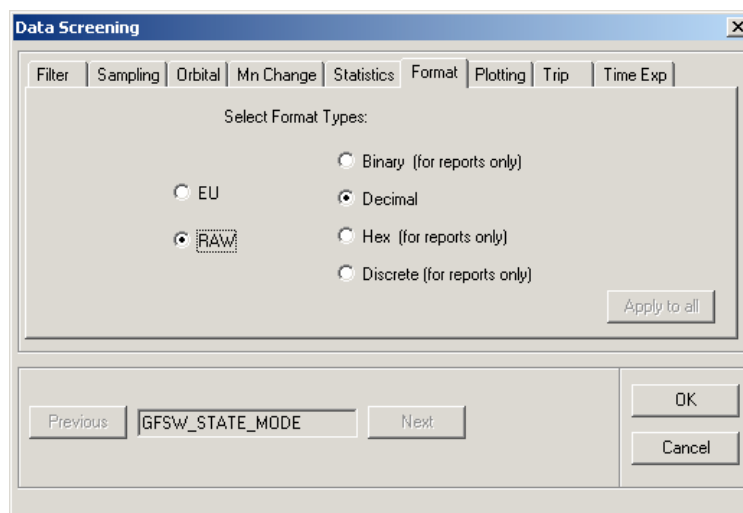


Figure 75: IDF Output Format Specification

- Check the boxes for requested statistics.

Note: You may click “Apply to All” to apply to all mnemonics highlighted on the IDF Editor main window.

- Click “OK” to accept the format parameters for the selected mnemonics or click another tab on the Data Screening window to continue adding other IDF data screening parameters.
- Save IDF when done.

6.7.7 Plotting Parameters

In order for an IDF to be used in the generation of plots, the Plotting fields in the IDF must be accurately entered. There may be up to 8 graphs per page. Plot pages and graph numbers must be entered consecutively (there may not be a page 3 when there is no page 2).

For plots that have a uniform number of graphs per page, use the Auto-Numbering utility in the IDF Editor Tools menu selection (see Section 6.6).

For plots that require custom number of graphs per page or plots per graph, enter the page numbers and graph numbers on the “Data Screening” | “Plotting” screen (see Figure 76).

The screenshot shows a dialog box titled "Data Screening" with a close button (X) in the top right corner. The dialog has a tabbed interface with the following tabs: Filter, Sampling, Orbital, Mn Change, Statistics, Format, Plotting (which is currently selected), Trip, and Time Exp. The Plotting tab contains two input fields: "Enter Page Number:" with a text box containing the value "1", and "Enter Graph Number:" with a text box containing the value "4". Below these fields is an "Apply to all" button. At the bottom of the dialog, there is a "Previous" button, a dropdown menu showing "AKPRSMPPRAW", a "Next" button, and two buttons labeled "OK" and "Cancel" on the right side.

Figure 76: Data Screening - Plotting Parameters

6.7.7.1 Plotting Mnemonic Vs. Mnemonic

Mnemonic vs. mnemonic plots require both mnemonics to be on the same graph. In addition, only two plots may be on a graph where two mnemonics are plotted against each other. For plot customization settings required for mnemonic vs. mnemonic plotting, see Section 3.4.2.3.

6.7.8 Trip Count and Trip Time Settings

Trip Count Reports display when a mnemonic filtering condition is true for a selected number of consecutive values (or more). Trip Time Reports display mnemonic values when a filtering condition is true for (at least) a selected number of seconds. Set the trip count and trip time settings from the "Trip" tab of the Data Screening IDF Editor window (see *Figure 77*).

Note: If no number is entered in the trip count entry, the Trip Count Report will default to 2.

Note: If no number is entered in the trip time entry box, the Trip Time Report will default to 1 second.

The screenshot shows the 'Data Screening' window with the 'Trip' tab selected. The window has a title bar with a close button. Below the title bar is a tabbed interface with tabs for Filter, Sampling, Orbital, Mn Change, Statistics, Format, Plotting, Trip, and Time Exp. The 'Trip' tab is active, displaying two input fields: 'Enter Trip Count (2-1024):' with the value '5' and 'Enter Trip Time in Seconds (1-3600):' with the value '60'. An 'Apply to all' button is located at the bottom right of the input area. Below the input area is a section with a 'Previous' button, a dropdown menu showing 'AKPRSMPPRAW', and a 'Next' button. At the bottom right are 'OK' and 'Cancel' buttons.

Figure 77: Trip IDF Settings

6.7.9 Time Expansion Setting

The Time Expansion setting allows ITPS ASCII Reports to expand the display of values based on a filter condition. Not only will values that pass the filter condition be displayed, but also the values for n seconds before and after a filter condition (*Section 6.7.1*) evaluates to 'true'. To set the time expansion setting,

- Select the "Time Exp" tab of the Data Screening IDF Editor window (see Figure 78)
- Enter the time expansion setting (seconds before and after filter condition evaluates to 'true').
- Click "OK" to accept the time expansion settings for the selected mnemonics or click another tab on the Data Screening window to continue adding other IDF data screening parameters.
- Save IDF when done.

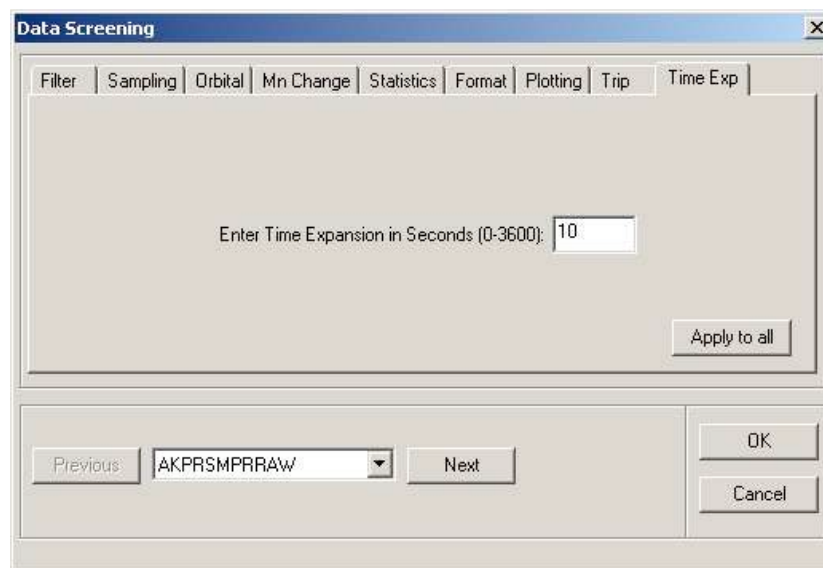


Figure 78: Time Expansion Setting

Section 7 Daily Production

Data extraction activities that are executed on a daily basis can be automated. These tasks - once added to the daily production list - will run every day at a pre-defined time until the task is removed from the list.

The following tasks may be added to daily production:

- Plot requests (*described in Section 3*)
- Report requests (*described in Section 4*)
- LTT data generation (*described in Section 5*)

NOTE: The activation of the daily production task (which governs what time every day the jobs are run) is preformed by the system administrator or during initial system installation. This is outside the scope of this document and is outlined in the Installation Notes, which accompany the ITPS Release Letters.

The generation of Daily Production products is governed by the 'percentage complete' property (see *Appendix B.1. for information on setting this property*). This number determines the minimum threshold (as a percentage of complete daily telemetry) required for Daily Production to execute.

NOTE: Constellation missions can be set up to run daily production jobs specific to each spacecraft when the percent complete for the corresponding spacecraft reaches the minimum threshold (rather than a single percent complete threshold).

If this percentage is not reached when Daily Production is scheduled for execution, ITPS will monitor the amount of data ingested into the Archive for the following 23 hours. Should the 'percentage complete' threshold be reached, Daily Production will go forward with execution. However, if it is not reached after 23 hours, the scheduled Daily Production jobs are abandoned. Daily

Production jobs may then be executed manually in 'force' or override mode where the 'percentage complete' setting is ignored (*as described in Section 7.4*).

7.1 Daily Production of Plots

To add or modify daily production plot requests:

- Select "Plots" from the ITPS Main Interface.



Figure 79: Plots - Daily Production

- Choose "Daily Production" from the "Plots" pull-down menu (*see Figure 79*).
- Click "Add" from the "Daily Production – Plots" list page (*see Figure 80*) to add plot requests to the list of pending daily production jobs. Highlight an existing request and click "Edit" to modify an existing request.

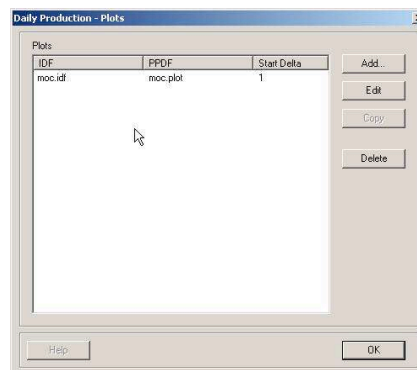


Figure 80: Daily Production - Plots List Screen

- Select or create a plot IDF on the "Request Plot..." screen (*see Figure 81*). (*See Section 3.1 for a description on choosing a plot IDF. See Section 6 for a detailed description of the IDF Editor.*)



Figure 81: Daily Production - Plot Request

- Enter the “Delta” (day number in the past) for which the daily production plots should be generated on a daily basis.

Note: Daily production requests always run for 00:00:00 to 00:00:00 on the following day (where stop time is exclusive).

The Delta setting determines how many days Daily Production waits before generating plots for any particular day. Setting a delta of 2 will generate requests for Sunday on Tuesday. Setting a delta of 3 will generate the request for Sunday data on Wednesday, and so on.

- Select a Default (see Section 3.1) or choose to create a User Defined Plot Parameter Definition file (see Section 3.3).

NOTE: The actual plot data file generated will have “Dyp” (for Daily Production) and the YYYYDDD representation of the date for which the plot was generated prepended to the filename of the plot definition file.

- Check the “Include Questionable Quality Data” box to include data that failed Reed-Solomon (RS) checking or quality checking (if applicable).

- Check the “Automatic Mnemonic Database Switching” box to have ITPS automatically determine which Mnemonic Database is best suited to data points requested. (See Sections 8.1 and 8.2 for information regarding selection and creation of Mnemonic Databases. See Section 8.3 for information on configuring automatic database switching.)
- Click the “OK” button to add the request to the daily production list.
- Add or edit another request on the “Daily Production – Plots” list page (see Figure 80) or click “OK” when finished adding daily production plot requests.

7.2 Daily Production of Reports

To add or modify daily production report requests:

- Select “Reports” from the ITPS Main Interface.

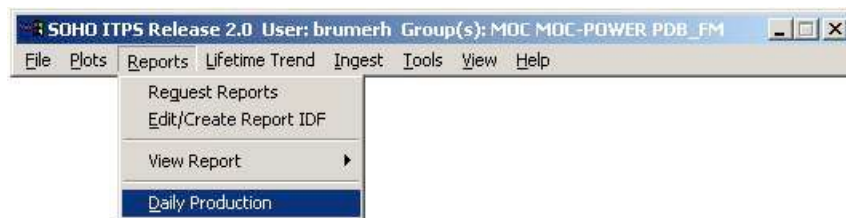


Figure 82: Reports - Daily Production

- Choose “Daily Production” from the “Reports” pull-down menu (see Figure 82).
- Click “Add” from the “Daily Production – Reports” list page (see Figure 83) to add report requests to the list of pending daily production report jobs. Highlight an existing request and click “Edit” to modify an existing report request.

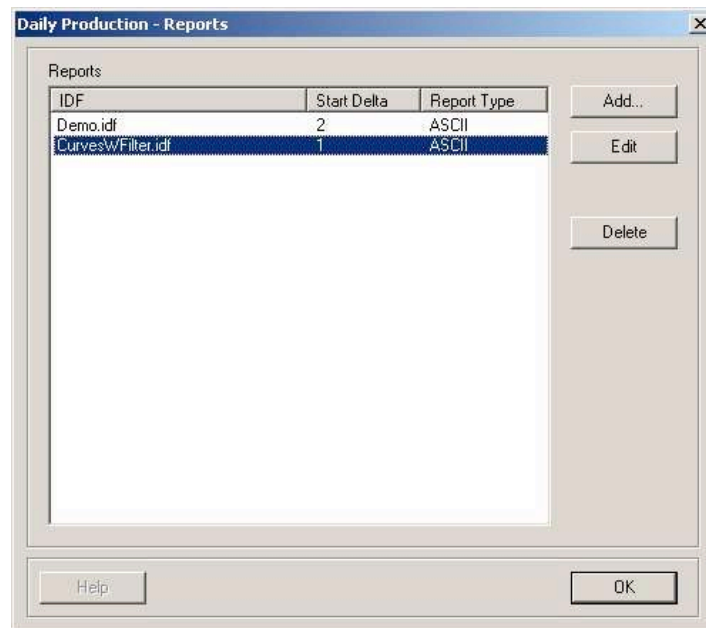


Figure 83: Daily Production - Reports List Screen

- Select the report type on the report request dialog screen (see Figure 84).
- Select or create a report IDF (See Section 4.2 for a description on choosing a report IDF. See Section 6 for a description of the IDF Editor.)

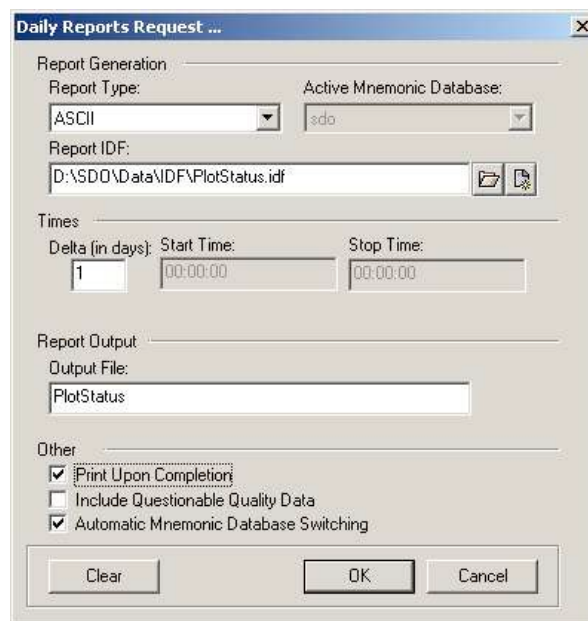


Figure 84: Daily Production - Report Request

- Enter the “Delta” (day number in the past) for which the daily production reports should be generated on a daily basis.

Note: Daily production requests always run for 00:00:00 to 00:00:00 on the following day (where the stop time is exclusive).

The Delta setting determines how many days Daily Production waits before generating reports for any particular day. Setting a delta of 2 will generate requests for Sunday data on Tuesday. Setting a delta of 3 will generate requests for Sunday data on Wednesday, and so on.

- Enter a report output filename.

NOTE: The actual report filename will be the output filename selected with “Dyp” (for Daily Production) and the YYYYDDD representation of the date for which the plot was generated prepended to the filename of the report output file selected.

- Check the “Print Upon Completion” check box to have the print job automatically printed on the default printer upon completion of the Dyp Report job.
- Check the “Include Questionable Quality Data” box to include data that failed Reed-Solomon (RS) checking or other quality checking (where applicable).
- Check the “Automatic Mnemonic Database Switching” box to have ITPS automatically determine which Mnemonic Database is best suited to data points requested. (See Sections 8.1 and 8.2 for information regarding selection and creation of Mnemonic Databases. See Section 8.3 for information on configuring automatic database switching.)
- Click the “OK” button to add the request to the daily production list.

- Add or edit another request on the “Daily Production – Reports” list page (see *Figure 83*) or click “OK” when finished adding daily production report requests.

7.3 Daily Production of LTT

To add or modify daily production LTT data extraction requests:

- Select “Lifetime Trend” from the ITPS Main Interface.



Figure 85: Lifetime Trend - Daily Production

- Choose “Daily Production” from the “Lifetime Trend” pull-down menu (*Figure 85*).
- Click “Add” from the “Daily Production – Lifetime Trend” list screen (see *Figure 86*) to add LTT Data Extraction requests to the list of pending LTT data extraction daily production jobs. Highlight an existing request and click “Edit” to modify an existing LTT data extraction request.

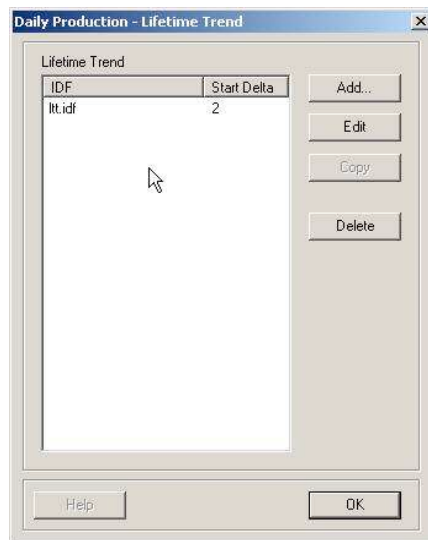


Figure 86: Daily Production – Lifetime Trend List Screen

- Select or create a Lifetime Trend data extraction IDF (See Section 6.7.5 for details regarding choosing a LTT Data Extraction IDF. See Section 6 for a description of the IDF Editor.)

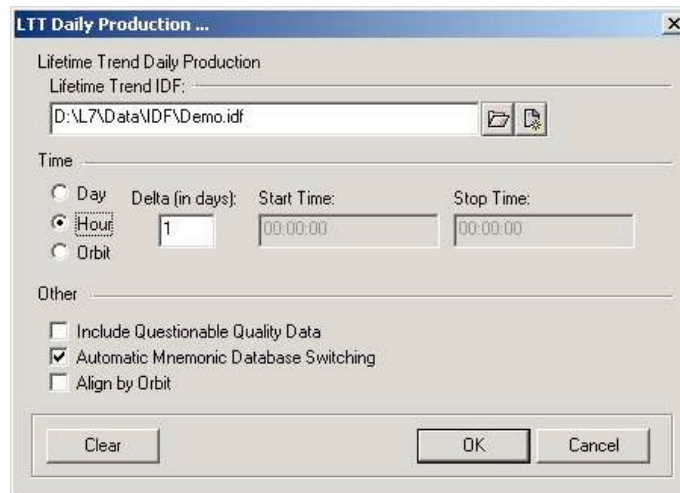


Figure 87: Daily Production - LTT Data Addition Window

- Select the type of LTT data to add during Daily Production: Daily (one entry/day), Hourly (up to 24 entries/day) or by Orbit (one per orbit).
- Enter the “Delta” (day number in the past) for which the daily production Lifetime Trend data extraction should be generated on a daily basis.

Note: Daily production Daily and Hourly requests always run for spacecraft time 00:00:00 to 00:00:00 on the following day (where the stop time is exclusive). Orbit requests will round 'up' to ensure the entire orbit time is used in generating the LTT entry.

The Delta setting determines how many days Daily Production waits before generating LTT Data Extractions for any particular day. Setting a delta of 2 will generate requests for Sunday data on Tuesday. Setting a delta of 3 will generate the requests for Sunday data on Wednesday, and so on.

- Check the “Include Questionable Quality Data” box to include data that failed mission appropriate ingest data quality (such as Reed-Solomon) checking.
- Check the “Automatic Mnemonic Database Switching” box to have ITPS automatically determine which Mnemonic Database is best suited to data points requested. (See Sections 8.1 and 8.2 for information regarding selection and creation of Mnemonic Databases. See Section 8.3 for information on configuring automatic database switching.)
- Click the “OK” button to add the request to the daily production list.
- Add or edit another request on the “Daily Production – Lifetime Trend” list page (see Figure 86) or click “OK” when finished adding daily production Lifetime Trend data extraction requests.

7.4 Manual Execution of Daily Production Jobs

It is occasionally useful or necessary to manually execute all the jobs scheduled for daily production. In addition, it is also useful to be able to manually run daily production in a ‘forced’ mode – where the percent complete threshold is ignored (see Section 7). There may be several cases where this will be useful:

- Because the ITPS computer was not running when daily production was scheduled for execution.

ITPS System Users' Guide – Daily Production

- Because a new job was added to the daily production jobs list – and did not run for the day in question.
- The need to go back to an earlier day to re-run daily production jobs because telemetry was found after daily production ran.

To manually run (and optionally override the 'percentage complete' Property) Daily Production:

- Select “Manually Run Daily Production” from the ITPS Main Interface ‘Tools’ menu.



Figure 88: Tools - Manually Run Daily Production

- Optionally mark the “Ignore Percent Complete” selection to run Daily Production and while ignoring the normal Daily Production threshold (see *Figure 89*).



Figure 89: Manually Run Daily Production Windows

- Click “Run” to execute Daily Production jobs for the current day (with appropriate deltas applied as described in Sections 7.1, 7.2 and 7.3).

Users can optionally mark the “Run Daily Production for the following day and year” and pick the year and day-of-year, to run the Daily Production jobs scheduled for a different day. Click “Run” to finish processing, or “Cancel” to exit.

Selected jobs are submitted to the Request Queue for execution and can be monitored on the Request Viewer window (see *Section 2.2*).

Section 8 Tools and Utilities

8.1 Selecting Alternate Mnemonic Databases

ITPS uses an internal Mnemonic Database (derived from mission PDB or ODB files). Normally a Mnemonic Database is created and selected for use upon ITPS installation. Once this is done a Mnemonic Database does not have to be reselected. It may be useful at times to revert to an alternate Mnemonic Database or to create a new Mnemonic Database.



Figure 90: Mnemonic Database Management Selection

To select an alternate Mnemonic Database:

- Choose 'Mnemonic Database' from the ITPS Main Interface "Tools" menu (see Figure 90).
- Select a Mnemonic Database for use from the Mnemonic Database selection screen (see Figure 91).
- Click "Set Active" to make the highlighted database the default.

The selected Mnemonic Database will be displayed in black. The unselected databases will be displayed in gray on the screen.



Figure 91: Mnemonic Database selection screen

8.2 Creating a new ITPS Mnemonic Database

When changes are made to the mission PDB or when modifications are made to the PDB or ODB files on the ITPS computer it becomes necessary to create a new ITPS Mnemonic Database for use by all ITPS processes.

Note: Access to this capability is restricted to ITPS users that belong to the MS Windows group named PDB_FM (see Appendix E for more on ITPS groups and capabilities).

To create a Mnemonic Database:

- Choose “Mnemonic Database” from the ITPS Main Interface “Tools” menu.
- From the Mnemonic Database selection screen (*Figure 91*) click the “Create...” button.
- Follow the mission specific screens, and select the appropriate mission PDB or ODB files.

8.3 Configuring Automatic Database Switching

When a user chooses the Automatic Database Switching option during the creation of plots or reports, ITPS will automatically determine which database version was in use during the time that the telemetry was acquired. Once this determination is done, ITPS will switch to the appropriate database for the time segment being decommutated.

The Automatic Database Switching settings must be updated upon creation of new DMDB versions. These settings should only have to be changed when a new mission PDB or ODB version is accepted and a corresponding new DMDB version is created. (See Section 8.2 for directions on creating a new Mnemonic Database.)

To update the auto-switch settings:

- Choose “Mnemonic Database” from the ITPS Main Interface “Tools” menu.
- Select “Edit Auto Switch...” from the Mnemonic Database selection screen (Figure 91).
- Click the “Add...” button from the “Edit Auto Switch Settings...” window to add a new DMDB (see Figure 92).

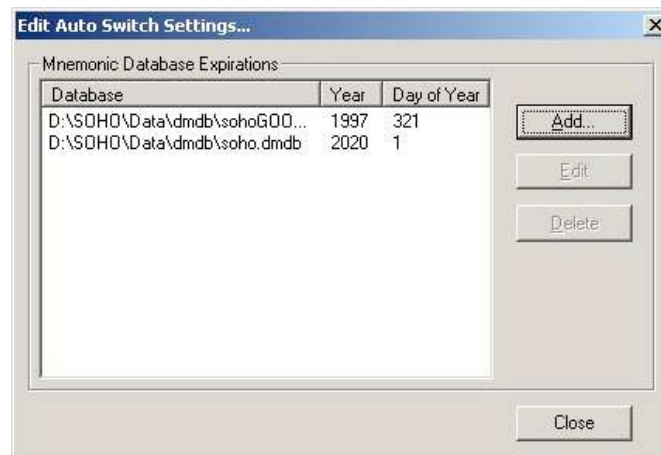


Figure 92: Edit Auto Switch Settings Window

- Follow directions on the DMDB Auto Switch Entry screen to select a new DMDB version and to adjust the DMDB expiration date (see Figure 93).

Note: The expiration date for the Mnemonic Database that was in use until the new mission PDB or ODB version was accepted should be changed to reflect the expiration date of that file.



Figure 93: Auto Switch Entry

8.4 User Defined Pseudo Mnemonics

ITPS users can create user-defined pseudo-mnemonics composed of existing mnemonics (native, or other pseudo-mnemonics) combined through the use of arithmetic and logical expressions. Once defined, these new pseudo-mnemonics may then be used in the generation of all ITPS data products in exactly the same way native mnemonics can be used.

Important Note: User-defined pseudo-mnemonics may contain any combination of native or user-defined mnemonics with one important stipulation: The user-defined pseudo-mnemonics which are used in the creation of yet another user-defined pseudo-mnemonic, must contain only native mnemonics and constants (and no other user-defined pseudo-mnemonics). Thus user define pseudo-mnemonics may only be nested one level deep.

8.4.1 Creating User Defined Pseudo Mnemonics

To create a user-defined pseudo-mnemonic:

- Select Mnemonic Database from the ITPS Main Interface “Tools” menu (see *Figure 90*).
- Click ‘User Pseudos’ From the Mnemonic Database selection screen (see *Figure 91*).
- Click ‘Add’ on the User Defined Pseudos management screen (see *Figure 94*).

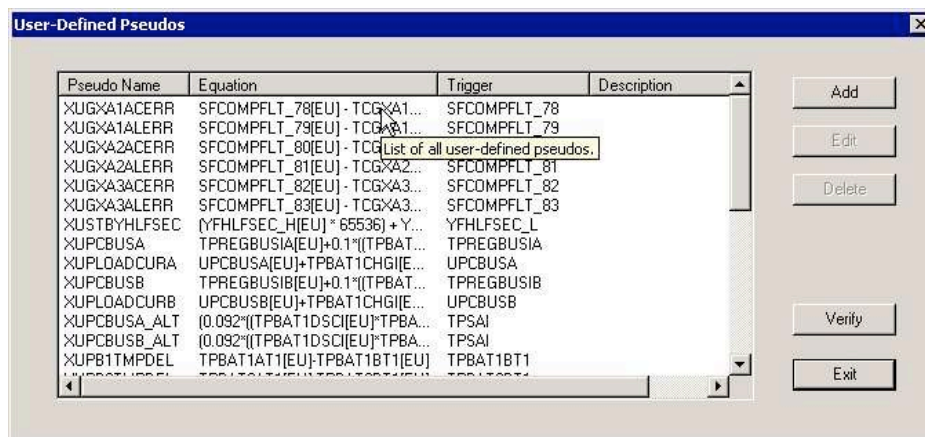


Figure 94: User Defined Pseudos Management Screen

- Enter the user-defined pseudo-mnemonic name on the “Add Pseudo – Step 1” screen (see *Figure 95*).

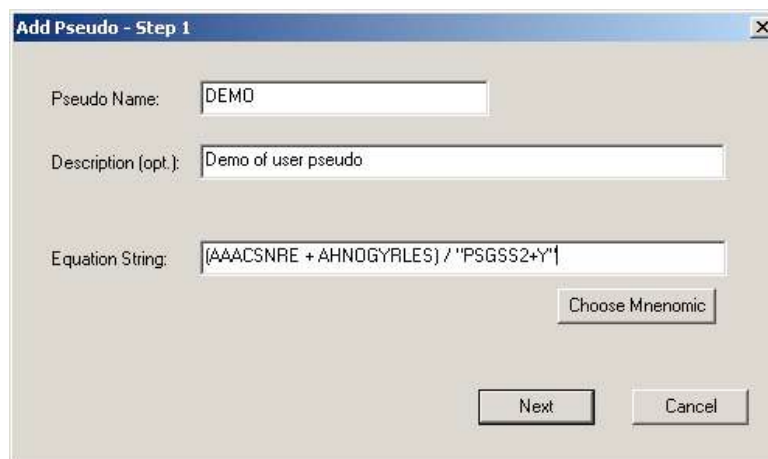


Figure 95: Add Pseudo - Step 1

Note: User-defined pseudo-mnemonics may contain up to 16 characters composed of uppercase letters, numbers and the underscore character.

- Enter an optional pseudo mnemonic description. The description string may not contain the 'I' pipe character.
- Construct the pseudo-mnemonic equation string. The equation string may be composed of mnemonics pseudo-mnemonic.
- Use the 'Choose Mnemonic' button to activate the mnemonic list screen (see *Figure 96*).
- Mnemonics may be combined using the following arithmetic operators: +, -, *, /, ^, (). Pseudo-mnemonics may also contain logical, trigonometric and arithmetic functions as detailed in Section 8.4.2.
- Use the filter and search fields (by mnemonic name or description) to assist in finding the desired pseudo-mnemonic components. (Wildcard searches and filtering follow the same syntax rules as does the IDF Editor as described in Sections 6.4 and 6.5.)

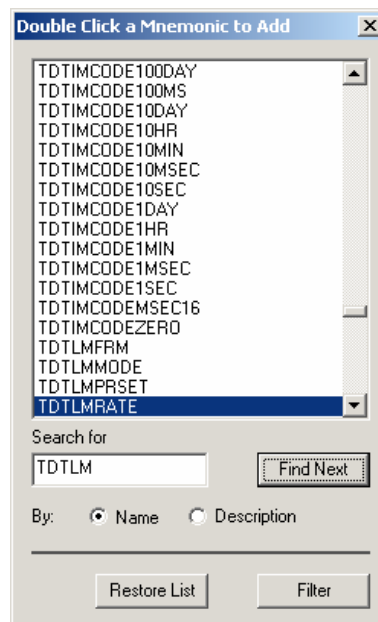


Figure 96: Choose Pseudo Component Mnemonic Screen

Note: When entering a decimal number that is smaller than 1, the user must enter the leading zero (i.e. 0.0092 instead of .0092).

*The * multiplication operator must be entered explicitly. Entering 0.2(mnemA+mnemB) is not valid. It must be written as 0.2*(mnemA+mnemB).*

- Click 'Next' to proceed to the "Add Pseudo – Step 2" screen (see Figure 97).



Figure 97: Add Pseudo - Step 2 Screen

- Double-click on any mnemonic to toggle the EU/RAW designation.

Note: Built-in mission pseudo-mnemonic and user-defined pseudo-mnemonics are always labeled EU regardless of what they contain. (If the components of a pseudo-mnemonic were included as RAW they will be used as RAW, the pseudo-mnemonic is always designated and labeled EU though).

- Click 'Next' to proceed to the "Add Pseudo – Step 3" screen (see Figure 98).

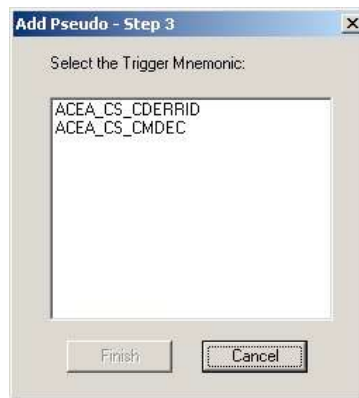


Figure 98: Add Pseudo - Step 3

- Select a mnemonic to serve as a trigger mnemonic (i.e. at which point the pseudo-mnemonic should be generated).
- Click 'Finish' to complete the user-defined pseudo-mnemonic creation process.

8.4.2 Built-in Pseudo Functions

There are several built-in functions available for inclusion in user-defined pseudo-mnemonics. The order of precedence among them is outlined in Section 8.4.3

Note: None of the built-in function names may be used as names of user-defined pseudo-mnemonics.

- **DELTA**(Mnemonic) returns the value of the difference between the absolute value of consecutive mnemonic samples.
- **LN**(x) returns the natural log of x (where x is a constant, a mnemonic or another pseudo-mnemonic)
- **LOG**(x) returns the base 10 log of x (where x is a constant, a mnemonic or another pseudo-mnemonic)
- **UNSIGNED**(x) returns the unsigned integer representation of its arguments x (where x is a constant, a mnemonic or another pseudo-mnemonic)
- **SIN**(x) returns the sine of x (where x is a constant, a mnemonic or another pseudo-mnemonic)

- **COS(x)** returns the cosine of x (where x is a constant, a mnemonic or another pseudo-mnemonic)
- **TAN(x)** returns the tangent of x (where x is a constant, a mnemonic or another pseudo-mnemonic)
- **ARCSIN(x)** returns the arcsine of x (where x is a constant, a mnemonic or another pseudo-mnemonic)
- **ARCCOS(x)** returns the arccosine of x (where x is a constant, a mnemonic or another pseudo-mnemonic)
- **ARCTAN(x)** returns the inverse function of the tangent function (where x is a constant, a mnemonic or another pseudo-mnemonic)
- **x ARCTAN2 x** returns arctangent angle and quadrant of x (where x is a constant, a mnemonic or another pseudo-mnemonic)
- **ABS(x)** returns absolute value of x (where x is a constant, a mnemonic or another pseudo-mnemonic)
- **AVGTIME(MnemonicA, N)** returns average of N seconds of mnemonic MnemonicA (average based on N seconds).
- **AVGPOINTS(Mnemonic, N)** returns average of N consecutive points of mnemonic MnemonicA (average based on N points).
- **Logical Operators** conditional logic operators: <, >, <=, >=, !=, =

8.4.3 Pseudo Function Order of Precedence

User-defined pseudo-mnemonics should be constructed so that they generated the required result. The order of precedence of operation for pseudo-mnemonic components is as follows:

- () most deeply nested first
- DELTA () (from left to right)
- UNSIGNED () (from left to right)
- << (bit shift left) >> (bit shift right) (from left to right)
- & (bit-and), | (bit-or) (from left to right)

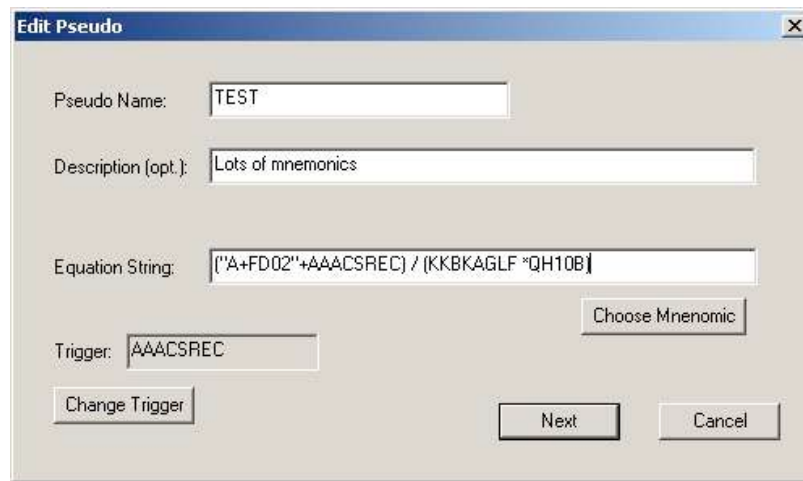
- SIN, COS, TAN, ARCSIN, ARCCOS, ARCTAN, LN, LOG, ABS.
(from left to right)
- ^ (power), ARCTAN2 (from left to right)
- *, / (from left to right)
- +, - (from left to right)
- NOT (from left to right)
- AND, OR, XOR, !=, =, <, <=, >, >= (from left to right)
- AVGTIME, AVGPOINTS (which are computed as soon as enough mnemonic points/seconds are accumulated).

8.4.4 Editing User-Defined Pseudo-Mnemonics

ITPS provides the user with the capability to edit user-defined pseudo-mnemonics.

To edit a user-defined pseudo-mnemonic:

- Select Mnemonic Database from the ITPS Main Interface “Tools” menu (see *Figure 90*).
- Click ‘User Pseudos’ From the Mnemonic Database selection screen (see *Figure 91*).
- Highlight a pseudo-mnemonic from the displayed list and click ‘Edit’ on the User Defined Pseudos management screen (see *Figure 94*).
- Update the user-defined pseudo-mnemonic name and description on the “Edit Pseudo” screen (see *Figure 99*).



Edit Pseudo

Pseudo Name:

Description (opt.):

Equation String:

Trigger:

Figure 99: Edit Pseudo

- Update the pseudo-mnemonic equation string as needed.
- Click 'Choose Mnemonics' to activate the available mnemonic list (see *Figure 99*).
- Click 'Change Trigger' to update the trigger mnemonic (see *Figure 99*).
- Click 'Next' to advance to the RAW/EU selection screen (see *Figure 97*).
- Click 'Done' when done.

8.5 Mnemonic Browser Utility

The Mnemonic Browser gives the ITPS user the ability to examine mnemonics available in the current Mnemonic Database including pseudo-mnemonics (Section 8.4 describes creation of pseudo-mnemonics). Users can also display all available mnemonic information including description, high and low limits, discrete states and calibration curves when available.

To examine Mnemonic Database mnemonics:

- Select Mnemonic Browser from the ITPS Main Interface “Tools” menu (see Figure 100).



Figure 100: “Tools” Mnemonic Browser Selection

- Select a mnemonic from the list of available mnemonics (see Figure 101).

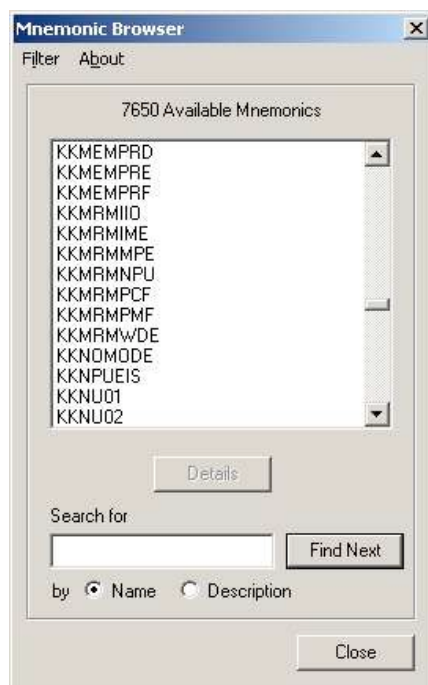


Figure 101: Mnemonic Browser List Screen

- Click on 'Details' or double-click the mnemonic to display the available mission specific mnemonic information screen (see Figure 102).

Mnemonic Information

Native Mnemonic

Name: Analog

Description:

Size (bits): 8 TLMInverse: N

Unit: V TLMReverse: N

Data type: Unsigned int State check: N

Subsystem: LASCO

Mnemonic Location in block:

Bits	Source	Dest	Seq	Offset	Packet id	MiSub	MJ	MSub
8	0	8	1	367	96	0	0	0
8	0	8	2	31	105	0	0	0

Linear Conversion:

Seq. Num	Raw Value	EU Value
1	0	0.000000
1	128	0.000000
1	255	12.400000

Figure 102: Example of Mission Specific Mnemonic Information Screen

- Click "More Details" to view additional mnemonic information (if available). See Figure 103 for a sample of this screen. Actual displays will differ based on available mission information.

More Information ...

Limit Sets:

Raw/EU	Red High	Red Low	Yellow High	Yellow Low	Switch Mnem.	Operator	Switch
EU			10.2	9.8	LIMIT_SWITCH	BW	1

Delta Limits:

Raw/EU	Red Delta	Yellow Delta	Trip Count	Switch Mnem.	Operator	Switch Low	Switch High
EU	0.2	0.2	5	LIMIT_SWITCH	BW	1	1

Discrete States:

Discrete States	Low Value	High Value	Foreground	Background

Context Mnemonic: LHHKMOD1
 Context Low Value: 1
 Context High Value: 1

Close

Figure 103: Sample Mission Specific Mnemonic Browser More Details Screen

- Click the 'Search for' field and 'Find Next' button to browse the mnemonic list by name or description (see *Figure 100*).

Note: You may search based on a sub-segment of a mnemonic name or on a sub-segment of a description by entering it in the search text box.

Mnemonics and description searches are not case sensitive.

Some mission mnemonic names may contain 'special' characters such as "+" and "-". To search for these mnemonics put a backslash character "\" before the 'special' character, to remove its special meaning from the search string.

The Mnemonic Browser list screen may also be customized to only display selected mnemonics. This selection can be done based on text found in either the mnemonic name or description. To display only selected mnemonics on the Mnemonic Browser list screen:

- Click "Filter" from the Mnemonic Browser list screen menu bar (*Figure 104*).

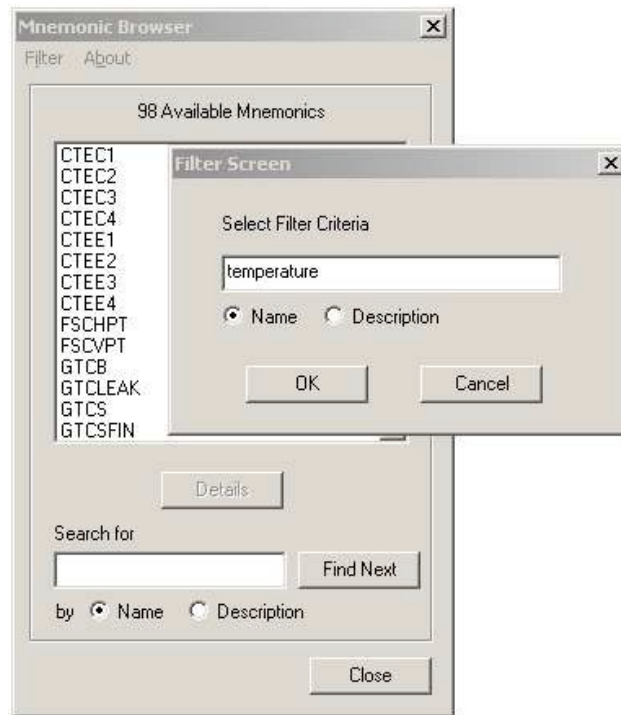


Figure 104: Mnemonic Browser Filter Screen

- Type the (case insensitive) filter string (with optional regular expression syntax) and click “OK”
- Examine the filtered list in the Mnemonic Browser list screen
- Clear the filter expression from the filter screen to reset the Mnemonic Browser to display all mnemonics.

8.6 IDF Verify Utility


IDFs may be verified by the IDF Verify utility to ensure they do not contain syntax errors.

To check an IDF:

- Select “Tools” from the ITPS Main Interface Window.
- Select “IDF Verify” from the “Tools” pull-down menu (*Figure 105*).



Figure 105: ITPS Main Interface “Tools” Pull-down Menu

- Type an IDF name or click the browse file folder icon  to select an IDF for verification (see Figure 106).
- Click “Submit” to begin verification.

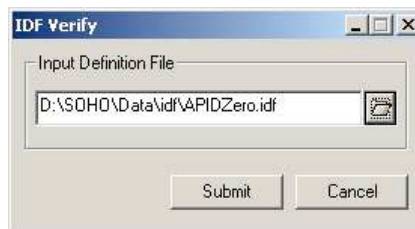


Figure 106: IDF Verify Window

- IDF Verify will either verify the file with an “IDF file is correct” message or it will produce a listing of IDF syntax errors (Figure 107).

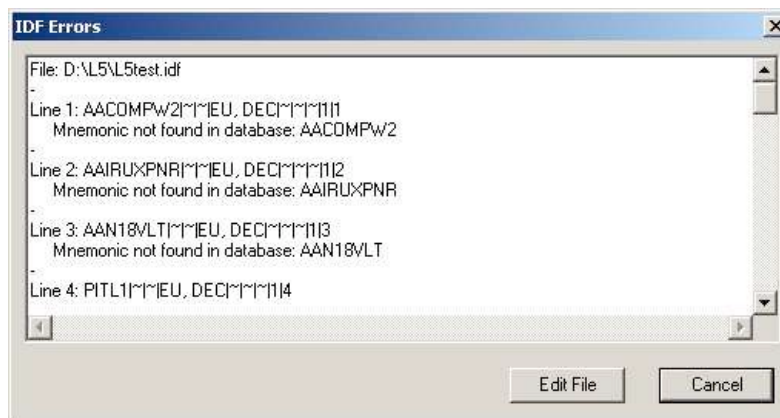


Figure 107: IDF Verify Error Screen

- Select “Edit File” to manually edit the file, correct any syntax errors and re-verify the IDF or use the IDF Editor (Section 6) to recreate the IDF.

8.7 Time Definition File (TDF) Editor Utility

TDFs are text files that contain “I” separated product request start and stop times. These files can be used to specify start and stop times for multiple report or plot requests. To create TDF files, use the TDF Editor Utility.

To start the TDF Editor:

- Select “Tools” from the ITPS Main Interface Window.
- Select “TDF Editor...” from the “Tools” pull-down menu (see *Figure 108*).



Figure 108: Select TDF Editor from “Tools” Menu

- Click the “Add” button on the TDF Editor Screen to add time pairs (see *Figure 109*).

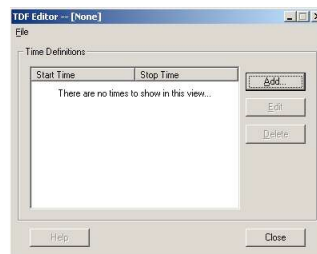


Figure 109: TDF Editor

- Enter report Start Time and Stop Time on the “Add Time Definition...” screen (see *Figure 110*).



Figure 110: TDF Editor Add Time Screen

- Click “OK” when done.

- Repeat the last two steps until all required report times are entered.
- Select “File” | “Save As” to save the TDF.
- Exit the utility when done.

8.8 Leap Second (LSF) Editor Utility

The Leap Second Editor tool provides ground-based leap second adjustments. Whenever a leap second is added to time, it (the second that essentially takes two seconds in time) must be added using the Leap Second Editor. The Leap Second Editor is accessible from the Tools menu (Figure 111).

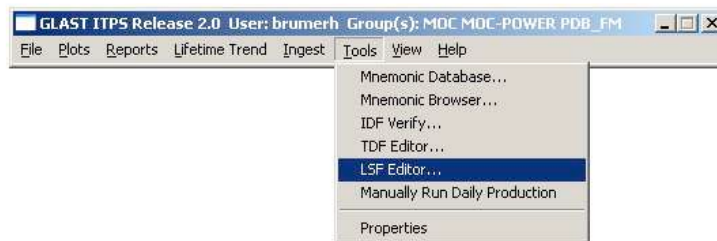


Figure 111 Leap Second Editor Selection

Note: At this time leap seconds may only be negative (Figure 112) (so that a second is added at the indicated time and the data from the second indicated and the second before it are squeezed into the same second). There is no provision to support removing a second from timestamps.

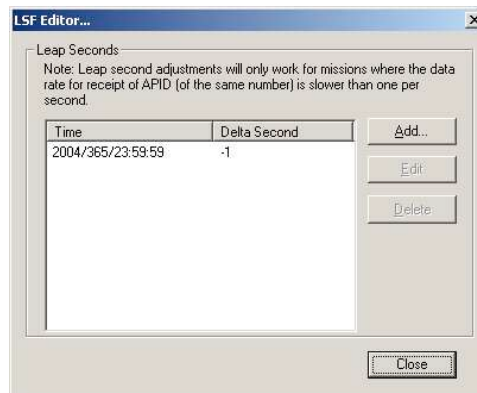


Figure 112 Leap Second Adjustment Screen

Note: Data contained in the second that is the actual leap second will be timestamped

in the last millisecond of the second before it.

As a result (and to ensure that consecutive data remains that way and does not move before earlier data in negative time jumps) this feature is only supported where the data rate for any particular packet ID (or minor frame number) is equal to one packet per second or slower.

Note: The logic in the timestamping of data is designed with contingencies for up to 15 seconds of time added over the mission lifespan. If more than 15 seconds are added (as leap seconds) during the life of a mission, developers must be contacted and the code changed to support this.

Data contained in the second that is the actual leap second will be timestamped in the last millisecond of the second before it.

Section 9 Data Ingestion

The Ingest program will process incoming housekeeping telemetry to create ITPS Archive files. Once activated, the Ingest will run autonomously, time ordering the data, removing duplicates, and detecting (and optionally correcting) Reed-Solomon (RS) errors for missions where this is applicable and finally merging their data into Archive files. The Ingest program will only ingest data that conforms to mission specific specifications.

Note: Ingest will automatically detect and process telemetry files whose filename conforms to expected formats located in the target directory. The naming specifications are outlined in Appendix F.

Each individual Archive file will contain no more than 24 hours of data. Ordinarily, several mission telemetry files will be merged to create a single Archive file.

Note: Archive files produced by Ingest are named in the format YYYYDDD.<MISSION>, where the YYYY is a four digits year and DDD is a three digits day of the year.

For missions that have RS error correction data embedded with the telemetry, RS checking is enabled by Ingest which will detect and attempt to correct data transmission errors using the RS correction fields.

After mission telemetry files are processed and merged into Archive files, the telemetry files may be deleted automatically (depending on the setting of the "Delete Input Telemetry Files" flag (see *Appendix B for information on changing this flag*)).

9.1 Operation

Since Ingest is a Windows Service it runs continuously in the background without manual intervention, automatically creating Archive files from incoming telemetry as it becomes available. Ingest is "loaded" upon ITPS software installation and runs until it is deactivated or removed from the system. Installation of the service requires Windows administrator privileges and is outside the scope of this document (see *ITPS Release Notes for directions to install and activate the ITPS Service*).

Note: Mission telemetry files must not be manually added or removed from the target directory while Ingest is running. Doing so may result in unpredictable impacts to Ingest operation. Ingest will check for files in the directory specified in the "Ingest Telemetry Input Dir:" property outlined in Appendix B.1. Since Ingest runs continuously, changing the Ingest Properties settings while Ingest is running may lead to loss of data and unexpected results. To make changes to the Ingest Properties or to manually add or remove files from the Ingest telemetry source directory, Ingest should first be paused. The changes should be made once the events window indicates that Ingest has paused. Ingest may be restarted once all changes have been made. See Section 9.2 for more information on this process.

To determine if the ITPS Ingest Service is running, or to activate the service:

- Open the "Settings" | "Control-Panel" from the Windows Start Menu.
- Double-click the 'Services' applet.
- Scroll down the list to "<mission prefix>IngestService". Status should be 'Started'. If not, click the "Start" button. A message should appear that <mission prefix>IngestService has successfully started. (This requires Windows administrator level privilege).
- Click the Startup... button. Under Startup Type, click the "Automatic" radio button. This will insure the service comes up whenever the system is rebooted. Set the recovery options for all failures to restart the service (accessible via the Services | Recovery tab).

9.2 Pausing Ingest

Since Ingest is a Windows Service an ordinary user cannot terminate it. The progress of Ingest can, however, be paused. Pausing Ingest allows users to modify the Ingest properties (see *Appendix B.1 for more information regarding Ingest related properties*).

To pause Ingest:

- Select “Ingest” from the ITPS Main Interface menu (see *Figure 113*).
- Select “Pause Ingest” from the Ingest Menu.
- Reselect “✓Pause Ingest” from the Ingest Menu to restart Ingest processing.

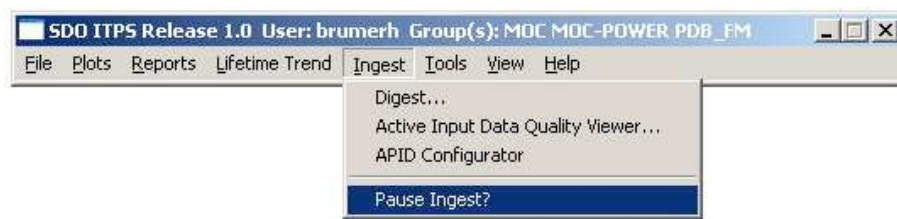


Figure 113: Ingest Menu

Note: Once Ingest is paused, it must be restarted prior to exiting the ITPS main interface. If Ingest is not manually restarted from the main interface, it will restart itself when the main interface is closed.

9.3 Input Data Quality (IDQ) Reports

The quality and volume of data processed by Ingest and contained in the ITPS Archive is contained in the Input Data Quality Reports. These reports contain information such as the number of data gaps, and (when applicable) the number of correctable and uncorrectable Reed-Solomon errors found in the ingested raw mission telemetry files.

Ingest generates several different data quality reports:

Active IDQ Viewer:	During the ingestion of raw telemetry files, lists an overview of the file ingestion process including data gap info.
--------------------	---

Static IDQ Reports:	Ingest maintains a detailed history of the contents of each individual telemetry Archive file. This report is updated with each access to the daily telemetry Archive file and, unlike the Active IDQ, its data is maintained continually with each 'run' of Ingest.
29 Hour Report:	Landsat7 specific display of the current state of the ITPS Archive for the last 29 hours (for use in dumping solid state record (SSR) data).
Digest:	Overview of status of ITPS Archive (based on a calendar year) color-coded based on percent complete for day. Provides access to Ingest tools and to utility to regenerate Static IDQ.

9.3.1 Active Input Data Quality Viewer

The progress of Ingest can be monitored by examining the messages in the Active IDQ Viewer window.

The report contains for each file ingested:

- Name of input file ingested.
- Identification of data gaps
- Missing VCDU numbers (when applicable)
- Last SSR block number detected in ingested file (when applicable). (This information in the report is intended to help FOT personnel determine which data to dump from the S/C on the next pass.)

The Active IDQ Viewer window will display messages that are generated after the window is opened. Thus it is advised that users should not close an Active IDQ Report window once it is opened; new windows will not contain any messages generated before the window was opened.


To manually activate the window (see *Figure 115*), select “Active Input Data Quality Viewer “ from the “Ingest “ option on the ITPS Main Interface (see *Figure 114*).



Figure 115: Active IDQ Report

9.4 Digest

The Digest utility provides an overview of the content of the ITPS Archive for the life of the mission and provides the ability to access several Ingest-related utilities such as Archive dump and Archive Delete.

Note: Digest reflects the current state of the Archive. It is not linked to Ingest processing and does not update dynamically. Refresh the Digest display by clicking the  icon.

To activate the Digest utility:

- Select “Ingest” from the ITPS Main Interface menu.
- Select “Digest” from the Ingest Menu (see *Figure 116*).

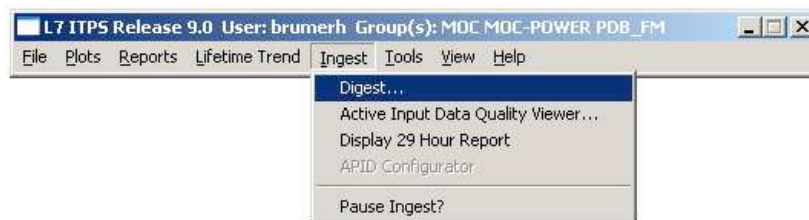


Figure 116: Ingest Menu Digest Selections

- Move the mouse over the day-of-year indicator boxes to see the available percentage completion data in the Digest status bar window (*Figure 117*).

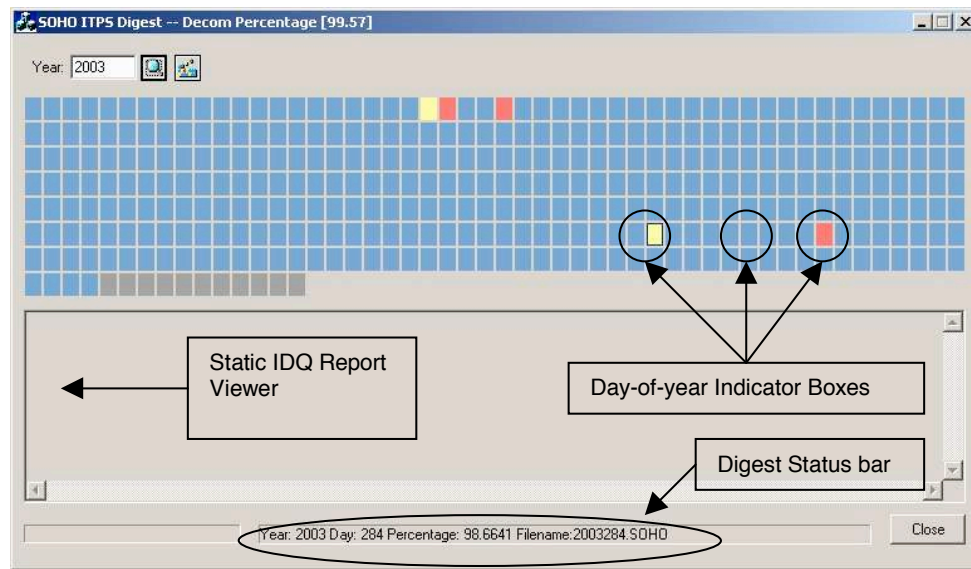


Figure 117: Digest Window

Days that have met the Daily Production threshold are displayed in blue.


Days that have not met the daily production threshold are marked in yellow.

Days that have less than 1% are marked in red.

Days that have an empty Archive file are displayed in dark gray.

Days that have no Archive file are displayed in light gray.

Note: The Daily Production threshold percentage (which is displayed on the Digest Title bar) is described in Section 7. The setting of this property is described in Appendix B.1.

- Change the Digest display year in the Digest display window (Figure 117) and click the  icon to begin rescanning the archive for a different year.
- Click “Close” to exit the Digest window.

9.4.1 Static IDQ Reports

The data quality information in individual ITPS Archive files is listed in files that are updated by Ingest as data is added to the specific Archive file.

Each Static Input Data Quality report contains quality data about any data received within the span of 24 hours from time of 00:00:00.000 to 23:59:59.999 (inclusive) for the given day.

Note: The Static IDQ reports are created by Ingest and by Digest. They are stored in the directory indicated by the main menu | Tools | Properties | Ingest | IDQ Report Dir property. They can be viewed in a text editor or via Digest.

A sample Static IDQ Report is provided below:

```
***** Static IDQ report for D:\Antonio\LA2000285.S000 *****  
  
LA File Name      = D:\ANtonio\LA2000285.S000  
Data_Year         = 2000  
First_SC_Time     = 285:00:00:05:520  
Last_SC_Time      = 285:23:59:59:520  
Uncorrectable RS  = 1  
Correctable RS    = 0  
Good VCDUs        = 69043  
Percent Capture   = 100%  
Ingest Time       = 10/23/00 14:10:42  
Total Data Gaps   = 1  
Data Gap 1        = (285.20.18.43.010(04151152) 285.20.20.18.455(04151228))
```

Note: Percent capture is calculated based on the gaps between consecutive tracked packets (or frames) and expected gaps between those packets (or frames). For example if a tracked packet is expected once per second, gaps between tracked packets greater than one second result in a data gap, and would affect the percent complete calculations. See Section B.1 for specifications on selecting the tracked packet (for CCSDS missions) and for setting the maximum tolerated gap between consecutive tracked packets.

To view and regenerate the Static Input Data Quality Report for any day:


- Select “Ingest” from the ITPS Main Interface menu.

- Select “Digest” from the Ingest Menu (see *Figure 116*).
- Double-click a box corresponding to any day that has telemetry (red, yellow, or blue) to regenerate the Static IDQ and display it in the Static IDQ Report Viewer portion of the Digest screen.
- Optionally right-click a box corresponding to any day that has telemetry (red, yellow, or blue) and select “Insert Into IDQ Database” to regenerate the Static IDQ for that day and add the percentage data to the mission IDQ database (for use in Daily Production).
- Click “Close” to exit the Digest window.

9.4.2 Batch Data Quality Generation

ITPS data quality data is normally generated upon ingestion. The percent complete determination (see Appendix B.1) is required for data production (see Section 7). Occasionally it is useful to regenerate the data quality data without re-ingesting all the data. This is true in cases where the Archive files are copied between computers, or if Archive data is restored after a catastrophic computer error.

To regenerate the ITPS Data Quality data:

- Select “Ingest” from the ITPS Main Interface menu.
- Select “Digest” from the Ingest Menu (see *Figure 116*).
- Click the  icon.
- Select the days for which to regenerate the IDQ data from the Archive File selection window (*Figure 118*).

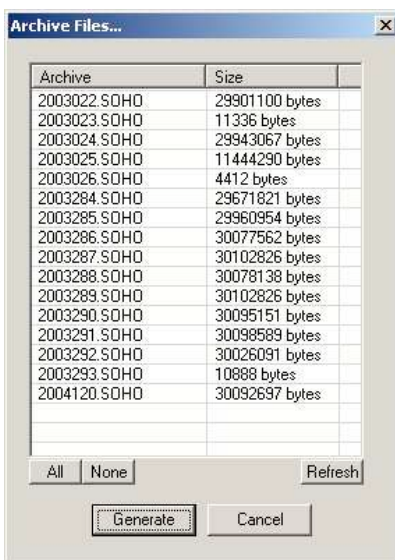


Figure 118: Archive File Selection Window

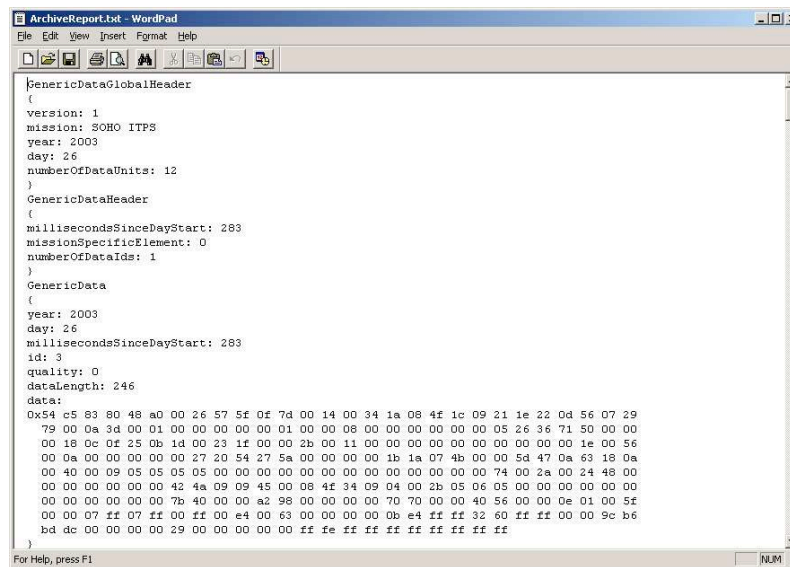
- Click "Generate" to begin the regeneration process.
- Click "Cancel" to exit the Archive File selection window.
- Click "Close" to exit the Digest window.

9.4.3 Archive Dump Tool

The Digest utility provides a method to dump the contents of the ITPS Archive files in compressed (headers only) or full format (hex data dump).

To dump the Archive for any daily file:

- Select "Ingest" from the ITPS Main Interface menu.
- Select "Digest" from the Ingest Menu (see *Figure 116*).
- Right-click a box corresponding to desired day. The day can be identified by checking the Digest status bar on the bottom of the Digest window.
- Select "Dump to Text" to generate a full dump of the selected Archive file (see *Figure 119*).



```
GenericDataGlobalHeader
{
  version: 1
  mission: SOHO ITPS
  year: 2003
  day: 26
  numberOfDataUnits: 12
}
GenericDataHeader
{
  millisecondsSinceDayStart: 283
  missionSpecificElement: 0
  numberOfDataIds: 1
}
GenericData
{
  year: 2003
  day: 26
  millisecondsSinceDayStart: 283
  id: 3
  quality: 0
  dataLength: 246
  data:
    0x54 c5 e3 80 48 a0 00 26 57 5f 0f 7d 00 14 00 34 1a 08 4f 1c 09 21 1e 22 0d 56 07 29
    79 00 0a 3d 00 01 00 00 00 00 01 00 00 08 00 00 00 00 00 05 26 36 71 50 00 00
    00 18 0c 0f 25 0b 1d 00 23 1f 00 00 2b 00 11 00 00 00 00 00 00 00 00 00 00 00 00 00
    00 0a 00 00 00 00 00 27 20 54 27 5a 00 00 00 00 1b 1a 07 4b 00 00 5d 47 0a 63 18 0a
    00 40 00 09 05 05 05 05 00 00 00 00 00 00 00 00 00 00 00 00 74 00 2a 00 24 48 00
    00 00 00 00 00 00 42 4a 09 09 45 00 08 4f 34 09 04 00 2b 05 06 05 00 00 00 00 00
    00 00 00 00 00 00 7b 40 00 00 a2 98 00 00 00 00 70 70 00 00 40 56 00 00 0e 01 00 5f
    00 00 07 ff 07 ff 00 ff 00 e4 00 63 00 00 00 00 0b e4 ff ff 32 60 ff ff 00 00 9c b6
    bd dc 00 00 00 29 00 00 00 00 ff fe ff ff ff ff ff ff ff
}
```

Figure 119: Archive Dump Tool Output

- Select “Dump to Text Condensed” for a dump of Archive headers only.
- Select the dump report output file.
- Click “Close” to exit the Digest window.

9.4.4 Archive Data Deletion

ITPS provides a utility for the deletion of segments of the telemetry Archive based on the timestamp.

Note: The deletion process is irreversible and will delete on the time level (and does not distinguish between mnemonics, frames, packets or APIDs) and should therefore be used with care.

The use of the capability to delete portions of the Archive is limited to users belonging to the Windows user group MOC-POWER (see Appendix E for more on ITPS groups and capabilities).

To begin the deletion process:

- Select “Ingest” from the ITPS Main Interface menu.
- Select “Digest” from the Ingest Menu (see *Figure 116*).
- Right-click a box corresponding to any day that has telemetry (red, yellow, or blue) and select “Archive Delete”
- Enter the time interval for deletion (see *Figure 120*).



Figure 120: Archive Delete Window

- Click the “Delete” button to begin removing data for the selected time interval from the ITPS Archive.
- Click “Cancel” when done.
- Click “Close” to exit the Digest window.

9.5 APID Configurator

Missions whose telemetry is contained in CCSDS APIDs can set up a filter using the APID Configurator to control which packets are to be stored by ITPS. By setting up a filter of APID numbers to be saved, the mission can save both processing time and storage space which is salvaged by ignoring unwanted packets.

Note: The APID numbers in the APID configuration tool are all in decimal. Missions that routinely refer to APIDs by their hexadecimal numbers need to ensure that corresponding decimal references are used when configuring ITPS Ingest.

To update selection of which packets are to be processed by ITPS.

- Select APID Configurator from the main menu Ingest option.
- Follow directions from the Current APID display screen to add or remove values (*Figure 121*).
- APIDs may be added individually, in ranges or comma separated. For example typing 1-4, 5, 6, 7-10 in the 'Add' box would add the APIDs 1 to 10.
- Optionally configure ingestion by Ground-Receipt time (for missions that ingest by Ground-Receipt time in addition to Spacecraft time).

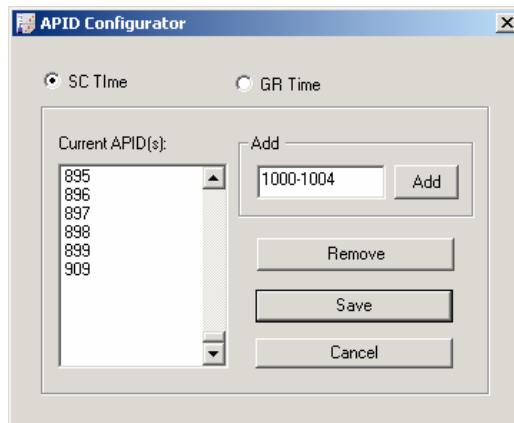


Figure 121 Ingest APID Configurator Screen

- Click Save when to save and exit.

Note: Failure to set up any valid APIDs (for missions that use CCSDS packet telemetry) will result in the inability of ITPS Ingest to acquire any data. This condition will be reflected in continual event warning messages.

9.6 Ingestion of Orbit Data Products

ITPS uses externally generated orbit data for determination of when orbits start and stop and for the timing of specific orbital events. The orbit start, stop and orbital events times are used during the generation of 'on-orbit' products (such as reports in Section 4.3, LTT in Sections 5.1 and 5.2) and for use in data screening (as described in Section 6.7.3). This feature is only available for missions that have meaningful orbits and have chosen to implement this capability.

9.6.1 Orbit Data Inputs

The format of the orbital data files is coordinated with mission operations personnel and may be documented in an ICD and is beyond the scope of this document.

The naming convention of input files, the location of expected files and control of the ingestion process is managed by the [STKAddition] ITPS.ini file properties. See Section B.2 for a description of these properties.

9.6.2 Orbit Data Ingestion

Orbit data files are ingested into ITPS in an autonomous manner analogous to the way telemetry data is ingested (see Section 9.1) into ITPS. Once files are detected, they are automatically ingested into ITPS, and the data they contain is then available for use in product generation. Like ingestion of telemetry, ingestion of orbital products occurs regardless of whether a user is logged in or not, and regardless of what other processes or job generation tasks are taking place.

Note: Much like telemetry data files, orbit data files must not be manually added or removed from the target directory while Ingest is running. Doing so may result in unpredictable impacts to Ingest operation. To move data into the target directory, pause Ingest (as described in Section 9.2) while copying the files and un-pause when done.

9.7 Importing External Mnemonics

Externally generated data can be imported into the ITPS Archive for use in all product generation tasks. The format and process of ingesting external data is described in Appendix G.

Section 10 ITPS Web Access

ITPS provides remote users access to telemetry data via its web interface. By accessing the ITPS web page users can use many of the features that are available to users on the ITPS computer at the mission control center.

Some of these features include:

- Generation of mnemonic reports
- Generation of plots
- Extraction of LTT data from the LTT statistics database
- Mnemonic Browser
- Viewing (and download) of existing reports
- Viewing (and download) of existing plots
- Viewing (and download) of Data Quality reports
- Viewing (and download) of ITPS Log files.

Note: The ITPS main web page will not automatically refresh unless JavaScript is enabled. Check your browser's properties (or check with your system administrator) to ensure that JavaScript is enabled.

10.1 Accessing the ITPS Web Site

The ITPS web page is username and password protected. Access is limited to authorized users. Please contact a mission control center system administrator for activation of access privileges. ITPS user that have access to ITPS at the MOC may need to be added to the Windows group "WEB" to have access to ITPS via the web (see *Appendix E for more on ITPS groups and capabilities*).

When accessing the mission ITPS web site, note the use of the https protocol in the URL name. For example, the Landsat 7 web site is currently at <https://ltas.nascom.nasa.gov>.

Once logged into the ITPS web page access to ITPS features is possible from the ITPS Main web page (see *Figure 122*).

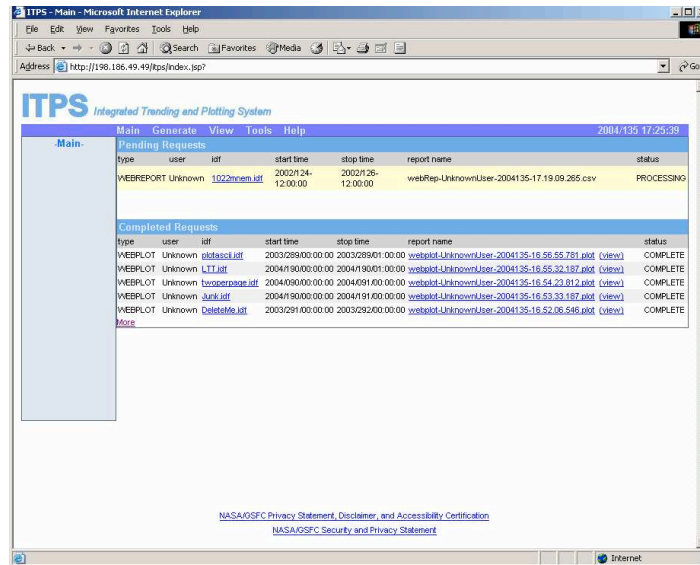


Figure 122: ITPS Main Web Page

The ITPS Main web summarizes all pending and completed report and plots requests (see *Figure 122*) and contains links to access of all ITPS web features.

10.2 Generating Reports via the Web

ITPS provides users with the capability to generate mnemonic reports via the web. These reports include:

- ASCII Reports (see *Section 4.3*)
- Mnemonic Change Reports (providing the threshold for the change is contained in an already existing IDF - see *Section 4.4*)
- Limit Reports (see *Section 4.5*)
- Statistics Report (see *Section 4.6*)

Note: The ITPS web interface provides limited capability to create IDFs. IDFs are needed in order to generate any of the ITPS report types listed above. See Section 4.2 for more on IDF generation and option and Section 10.7 for information on creating an IDF via the web interface. If an IDF is needed that provides more functionality than is possible via the web interface, it must be created on the ITPS computer at the mission control center.

To generate a report via the web:

- Access the ITPS Main Web Page (see Section 10.1).
- Click the “Generate” link from the top navigation bar (see Figure 122).
- Click on the “Report” link on the left menu panel (see Figure 123).
- Select an existing Input Definition File (IDF).

ITPS - Generate Report - Microsoft Internet Explorer

Address: <https://198.186.58.99:8443/tps/generate.jsp?type=report&nav=generate>

ITPS Integrated Tranding and Plotting System

2007/009 16:20:06

Generate...

active mnemonic database: lro

select report type

ASCII

select input definition file (IDF)

all_mnemonics.idf (View IDF)

start time

2007/009/00:00:00 2007/009/12:00:00

YYYYDD-HHMMSS YYYYDD-HHMMSS

select a time definition file (TDF)

NONE (View TDF)

options

☐ include teled reed-solomon data?

☒ View upon completion?

Submit Reset

[NASA/JSC Privacy Statement, Disclaimer, and Accessibility Certification](#)

[NASA/JSC Security and Privacy Statement](#)

Figure 123: Request Reports Web Page

- Click on “View IDF” to read the contents of a selected IDF.
- Select a time range for the report or a TDF for a group of reports.
- Select “View upon completion” to have the report pop-up automatically when done (requires Javascript activation).
- Click “Submit” when done.
- Follow directions on the Request Report follow-up screen (see *Figure 124*) to return to the Request Report web page (see *Figure 123*) or to return to the ITPS Main page (see *Figure 122*).

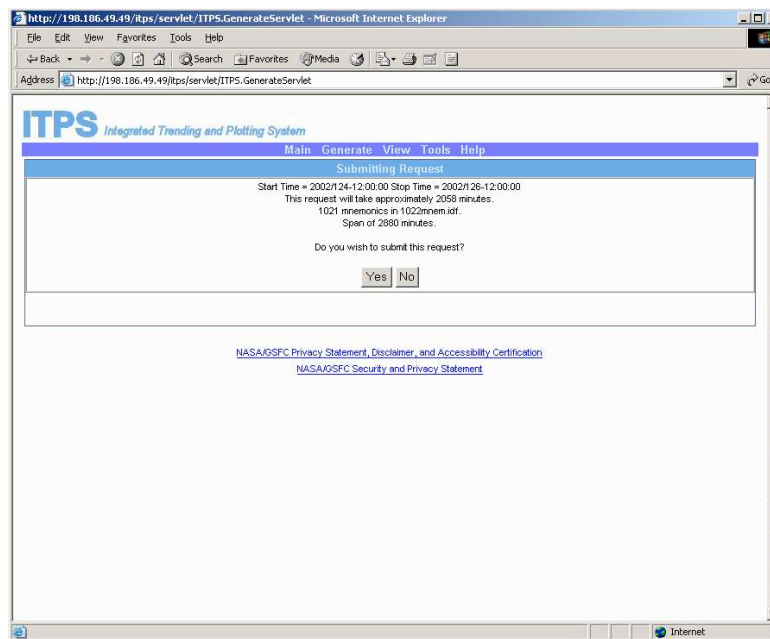


Figure 124: Request Report Follow-up Screen

Once a request is submitted for processing, progress can be monitored via the ITPS Main web page. Requests that are pending, or are in the process of being generated are listed in the Pending Requests section of the ITPS Main web page. Requests that are complete are listed in the Completed Requests portion of the ITPS Main web page (see *Figure 122*).

To view a report request output file once the request is complete:

- Click the “Main” link from the top navigation bar.
- Left-click the output filename in the Completed Requests portion of the ITPS Main web page to view the report in the browser or to download the file to your local computer (for users using Internet Explorer).

10.3 Generating Plots via the Web

ITPS provides users with the capability to generate and view plots via the web.

Note: An IDF is needed in order to create a plot. The ITPS web interface provides limited capability to create IDFs. See Section 4.2 for more on IDF generation and options, and Section 10.6 for more information on creating an IDF via the web interface. If an IDF is needed that provides more functionality than is possible via the web interface, it must be created on the ITPS computer at the MOC.

To generate plots via the web:

- Access the ITPS Main Web Page (see Section 10.1).
- Click the “Generate” link from the top navigation bar (see Figure 122).
- Click on the “Plot” link on the left menu (see Figure 125).
- Fill in Request Plot web page fields (see Figure 125).

Note: A pre-existing IDF must be available. (See Section 4.2 for more information on IDF generation and IDF options, and Section 10.6 for creating an IDF via the web interface.)

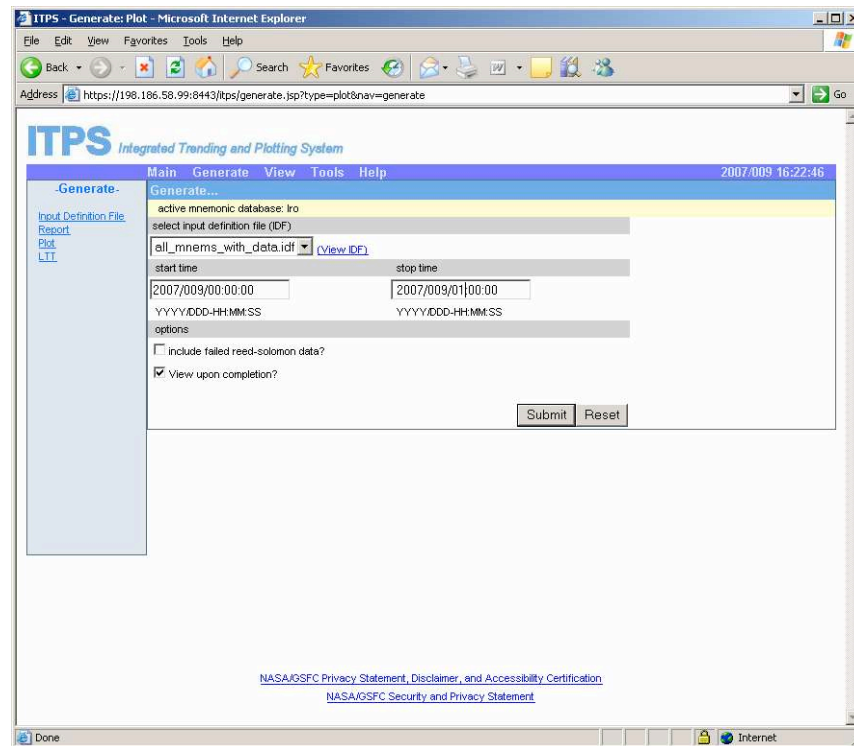


Figure 125: Request Plot Web Page

- Select “View upon completion” to have the plot pop-up automatically when done (requires Javascript activation).
- Click “Submit” when done.
- Follow directions on the Request Plot follow-up screen (see Figure 126) to return to the Request Plot web page (see Figure 125) or to return to the ITPS Main page (see Figure 122).

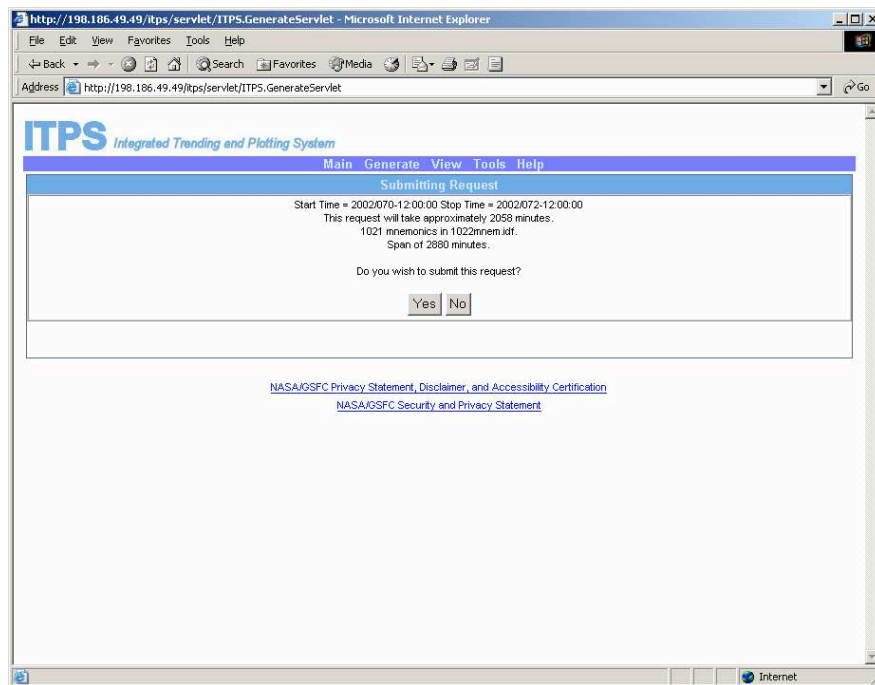


Figure 126: Request Plot Follow-up Screen

Submitted plot requests are listed in the Pending Requests section of the ITPS Main web page (see Figure 122). Once complete they are listed in the Completed Requests portion of the page (see Figure 127).

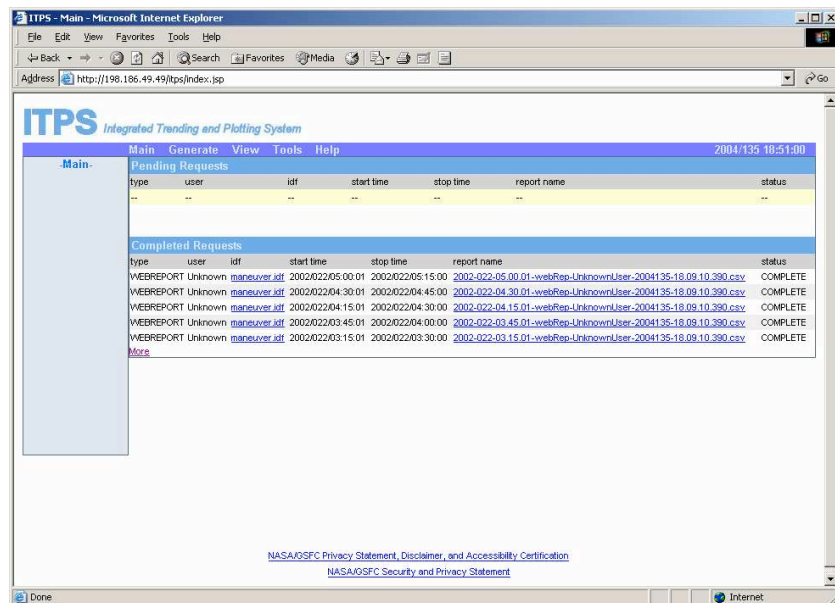


Figure 127: Request Complete Screen Segment

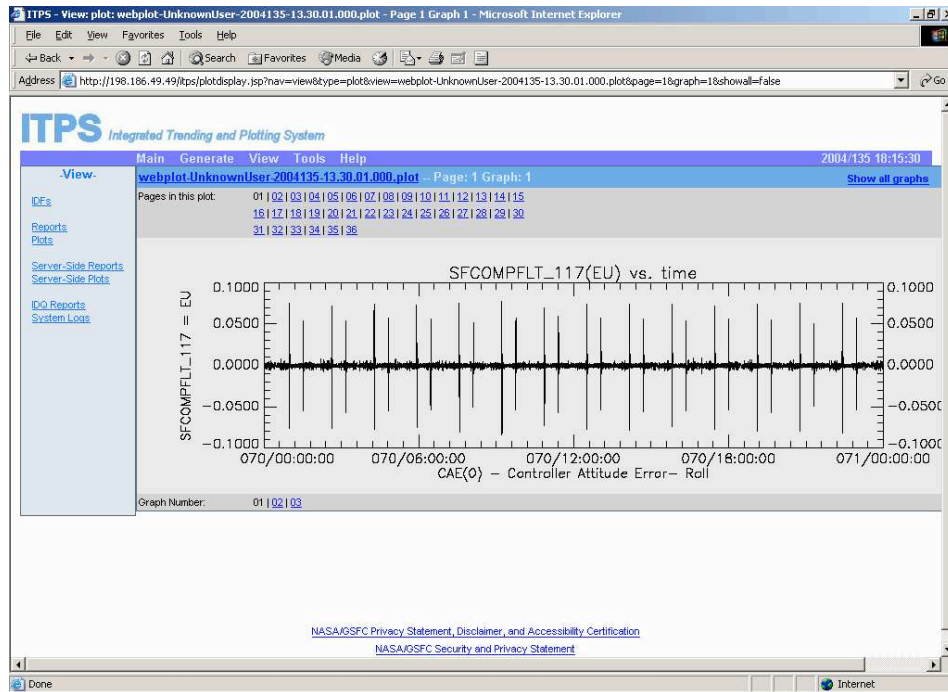


Figure 129: ITPS Plot Web Page

10.4 Converting Plots to PDF

Web generated plots can be converted to PDF. To convert a plot to PDF format:

- Click the Generate PDF button from the web plot display page (Figure 130).

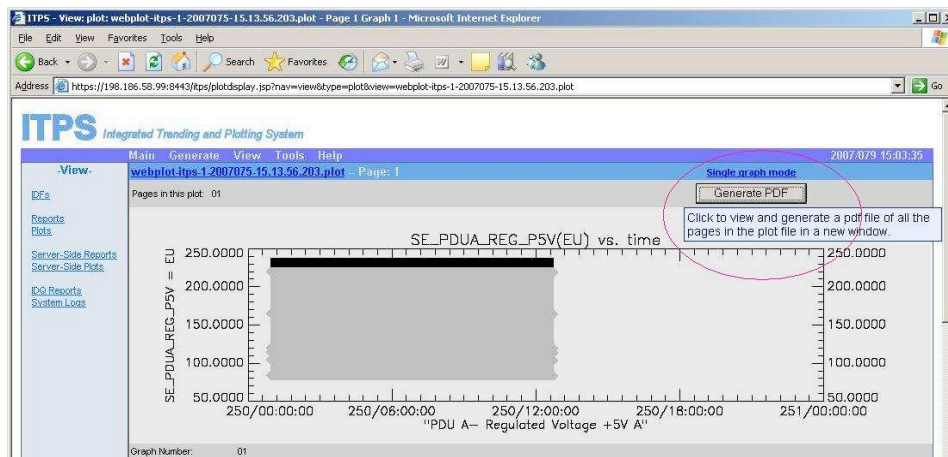


Figure 130Plot Generate PDF Option

- View the created PDF file in the new browser window that opens. This process may take some time depending on how many data points must be converted.

Note: Use of this feature requires activation of JavaScript capability in the browser. In addition (as the PDF file opens in a new browser window) pop-up blocking must be disabled when selecting to generate an ITPS plot PDF.

10.5 Extracting Lifetime Trend Data via the Web

ITPS provides users with the capability to extract previously compiled Lifetime Trend statistics data via the web. The data can be extracted to report text files or to plots.

Note: LTT data is normally generated on a daily basis by the Daily Production functionality of ITPS (see Section 7). Only data points that have already been stored can be extracted. Likewise, if data is only compiled on a daily basis 'by-day' – but not 'by-orbit', it will only be available 'by-day'.

To extract LTT data via the web:

- Access the ITPS Main Web Page (see Section 10.1).
- Click the “Generate” link from the top navigation bar. (see Figure 122).
- Click on the “LTT” link on the left menu panel. (see Figure 131).

ITPS Integrated Trending and Plotting System

2007/009 16:25:32

Generate

Request LTT

active mnemonic database: lro

select report input definition file (IDF)

all_mnemonics.idf

select time or orbit range

☒ daily (YYYY/DDDD)

☐ hourly (YYYY/DDDD:HH)

☐ orbit

start 2006/300 stop 2007/001

select ascii or plot output type

☒ Ascii

☐ Plot

☐ options

☒ view upon completion?

Submit Reset

[NASA/GSFC Privacy Statement, Disclaimer, and Accessibility Certification](#)

[NASA/GSFC Security and Privacy Statement](#)

Figure 131: Extract LTT Screen

- Select an existing Input Definition File (IDF).
- Select a year and day range or an orbit range for LTT extraction.
- Choose the output type “ASCII” for a report or “Plot”.
- Select “View upon completion” to have the completed LTT extraction pop-up automatically (requires that the browser permit Javascript).
- Click “Submit” when done.
- Follow directions on the LTT Request follow-up screen (see Figure 132) to submit or abandon the request.

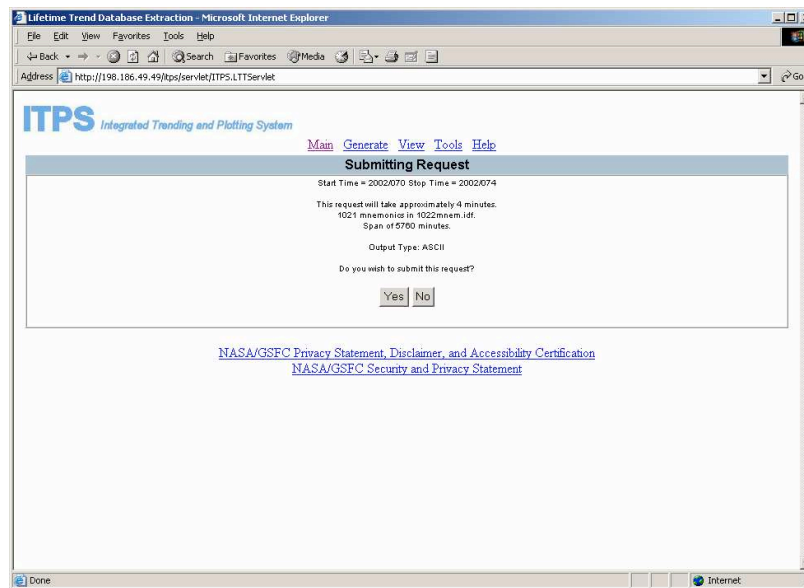


Figure 132: LTT Request Follow-up Screen

Once an LTT extraction request has been submitted for processing, progress can be monitored via the ITPS Main web page. Requests that are pending, or are in the process of being generated are listed in the Pending Requests section of the ITPS Main web page. Requests that are complete are listed in the Completed Requests portion of the ITPS Main web page (see *Figure 122*).

To view an LTT extraction report file or plot once the request is complete:

- Click the “Main” link from the top navigation bar to return to the ITPS Main web page (see *Figure 122*).
- Left-click the report filename or the ‘view’ beside the plot name in the Completed Requests portion of the ITPS Main web page to view the report or plot (see *Figure 133*) in the browser.

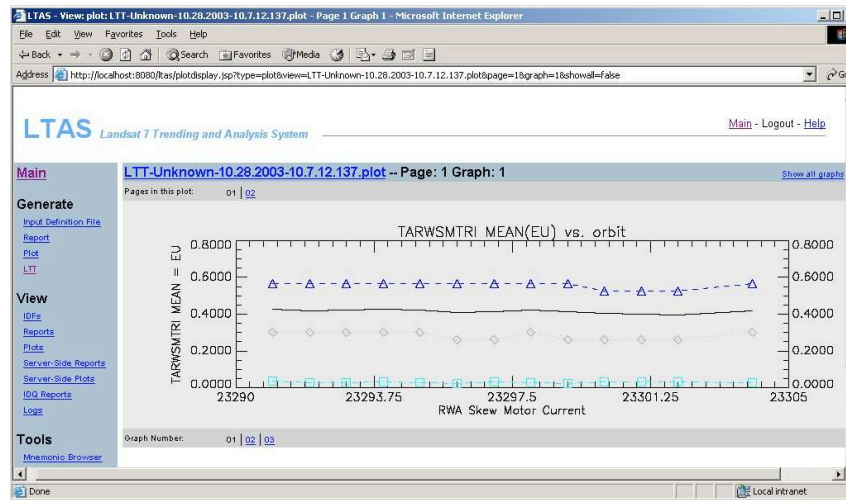


Figure 133: LTT Plot Page

10.6 Editing Plots (Y Scale) via the Web

Users can modify the Y Axis high and low scale, or to change the title of web created plots.

To modify these settings:

- Access the ITPS Main Web Page (see Section 10.1).
- Click the “Tools” link from the top navigation bar. (see Figure 122).
- Click on the “Edit Plot” link on the left menu panel (see Figure 134).

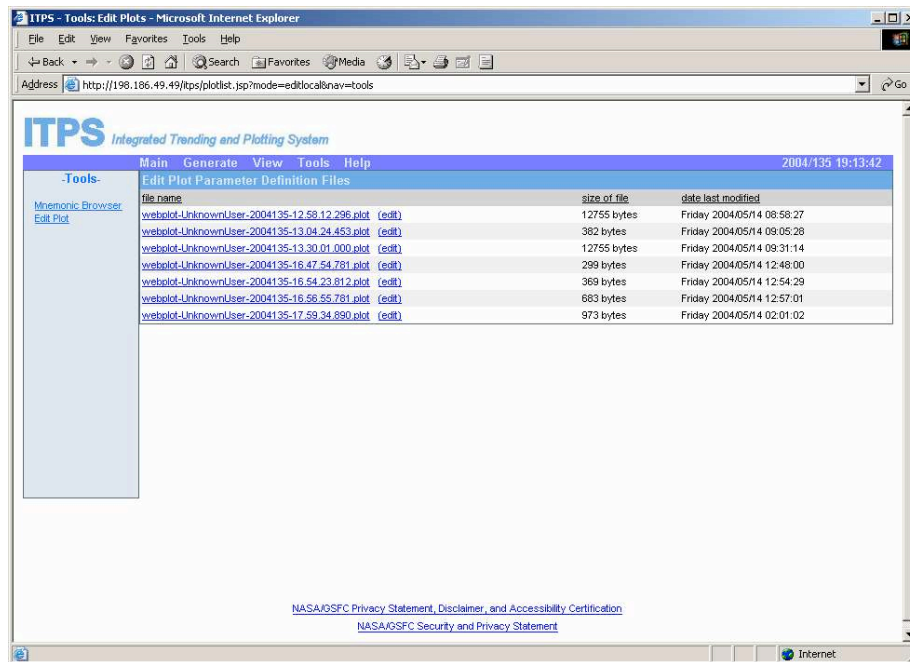


Figure 134: Edit Web Plot List Screen

- Enter the new (optional) title and new Y Axis high and low scales (see *Figure 135*)

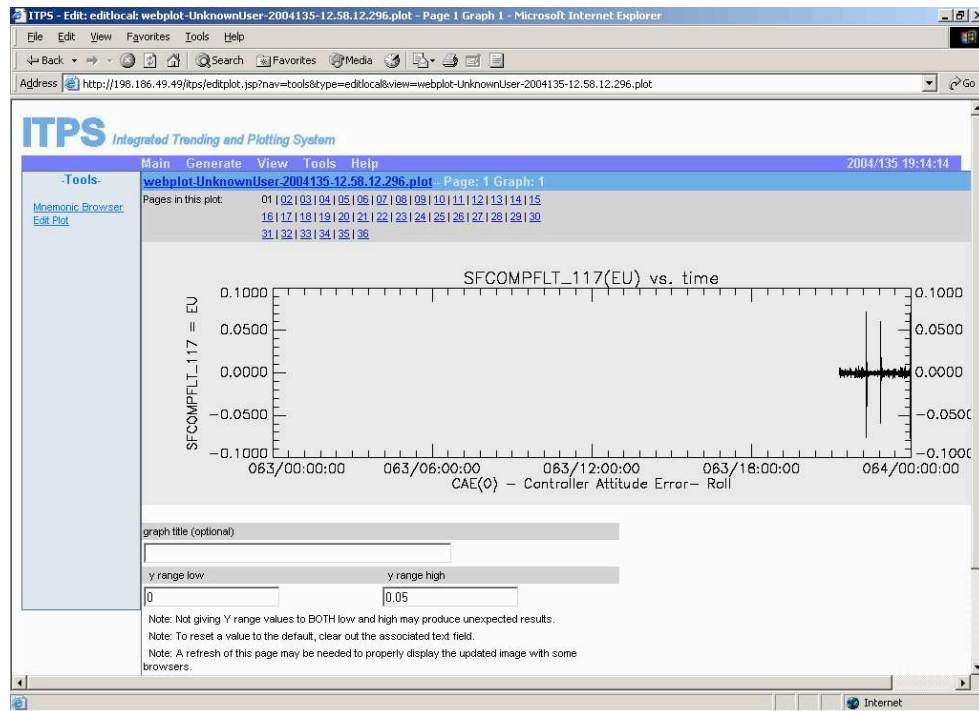


Figure 135: Edit Web Plot Screen

Note: When entering new Y Axis scales, both the y low and the y high values must be entered. Entering a single value may cause display errors.

To reset any of the values to the system default values, simply erase the context of the corresponding entry fields.

- Click the “Generate Plot” button at bottom of the “Edit Web Plot” screen to regenerate the plot with the new values.

Note: Some browsers will not refresh the display when clicking the “Generate Plot” button, until the browser “Refresh” button is clicked.

10.7 Generating IDFs via the Web

IDFs are needed in order to control the process of report or plot generation. The data in IDFs determine which mnemonics will be included in the requested report or plot and what options are selected by the user.

The process of creating IDFs at the mission control center (not using the web interface) is detailed in 5.3.

Users can also create minimal IDFs using the web interface. These IDFs will contain only one mnemonic and will not have any filtering, plot positioning or data manipulation options available in MOC generated IDFs.

To create an IDF using the web interface:

- Click the “Generate” link from the top navigation bar. (*see Figure 122*)
- Click on the “Report” link on the left menu panel. (*see Figure 123*)
- Access the ITPS Main Web Page (*see Section 10.1*)
- Click the “Generate” link from the top navigation bar. (*see Figure 122*)
- Click on the “Input Definition File” link on the left menu panel. (*see Figure 136*)
- Type a mnemonic, substring of a mnemonic or part of a mnemonic description on the Create Input Definition File (IDF) – Step 1 screen (*see Figure 136*)

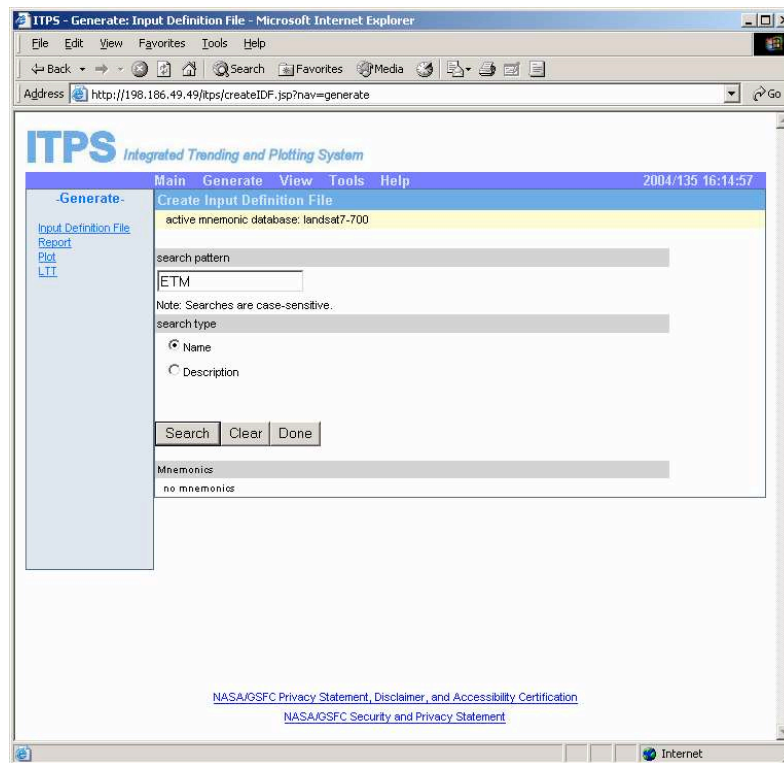


Figure 136: Web IDF Generation – Step 1

- Click “Submit” when done.
- Select the mnemonic to use from the Create Input Definition File (IDF) – Step 2 screen (see Figure 137).
- Click “Submit” when done.
- Follow directions to add more mnemonics to the IDF.
- Click ‘Done’ when finished adding mnemonics to the IDF. Note the name of the computer-generated IDF for future use.
- Choose to create another IDF or to return to the ITPS Main web page.
- The created IDF(s) may now be used in generation of reports (see Section 10.2) or plots (see Section 10.3).

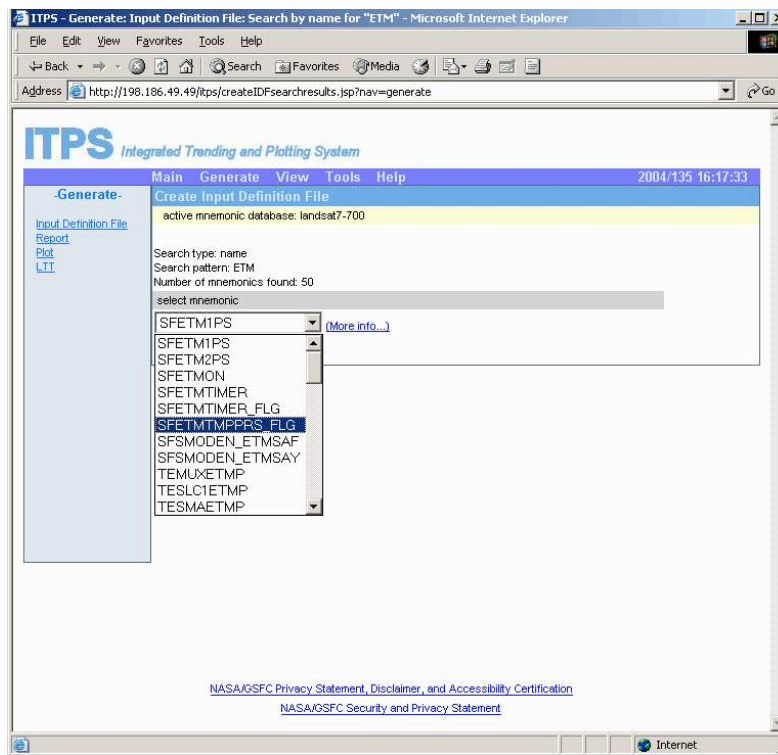


Figure 137: Web IDF Generation - Step 2

10.8 Web Viewing ITPS Files

The ITPS web interface provides the capability to view existing ITPS files that were generated at the control center ITPS console (as opposed to via the web) by clicking on the links in the View section of the top navigation bar. By following the links and selecting a file, users can view files in the browser window or can save them to their hard disks (depending on the browser this can be done by either clicking on the file links or right-clicking on the file link and use the save to disk option as available).

10.9 Web Mnemonic Browser

The mnemonic browser feature allows users to view mnemonic information (as contained in the ITPS Mnemonic Database) via the web.

To view information on any mnemonic:

- Click the “Tools” link from the top navigation bar.

- Click on the “Mnemonic Browser” link on the left menu panel (*see Figure 138*).
- Type a mnemonic name (or part of the name), a mnemonic description (or part of the description) in the Search Pattern entry box.

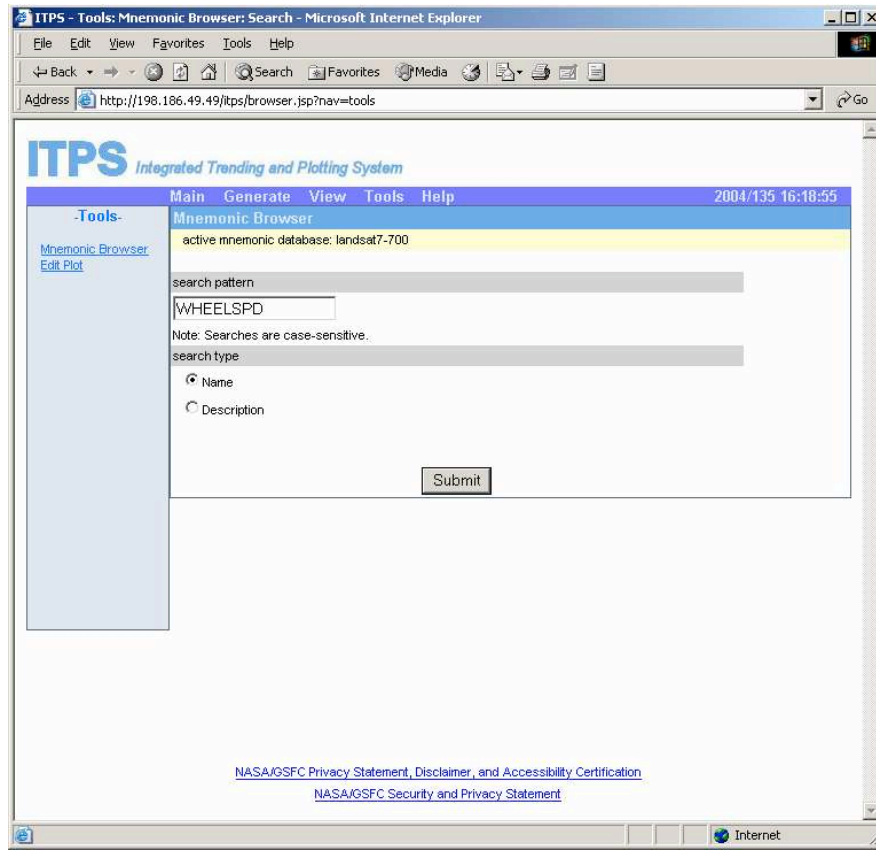


Figure 138: Mnemonic Browser Search Screen

- Click the Submit button.
- Click the mnemonic name (see Figure 139) to view mnemonic details (see Figure 140).

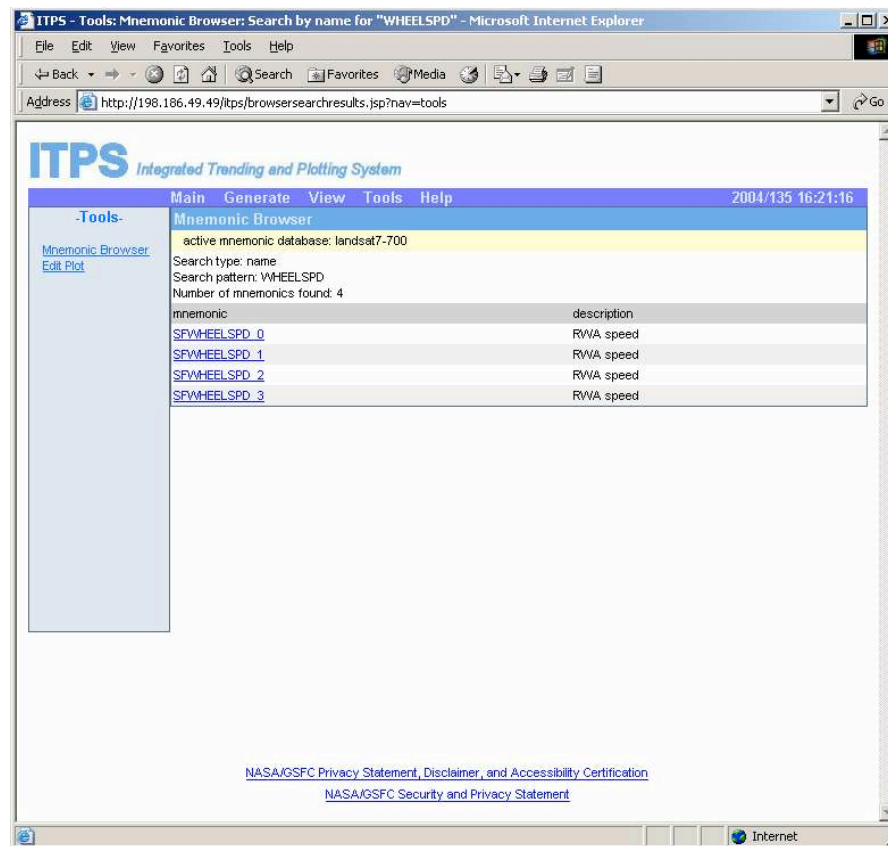


Figure 139: Mnemonic Browser Mnemonic Selection Screen

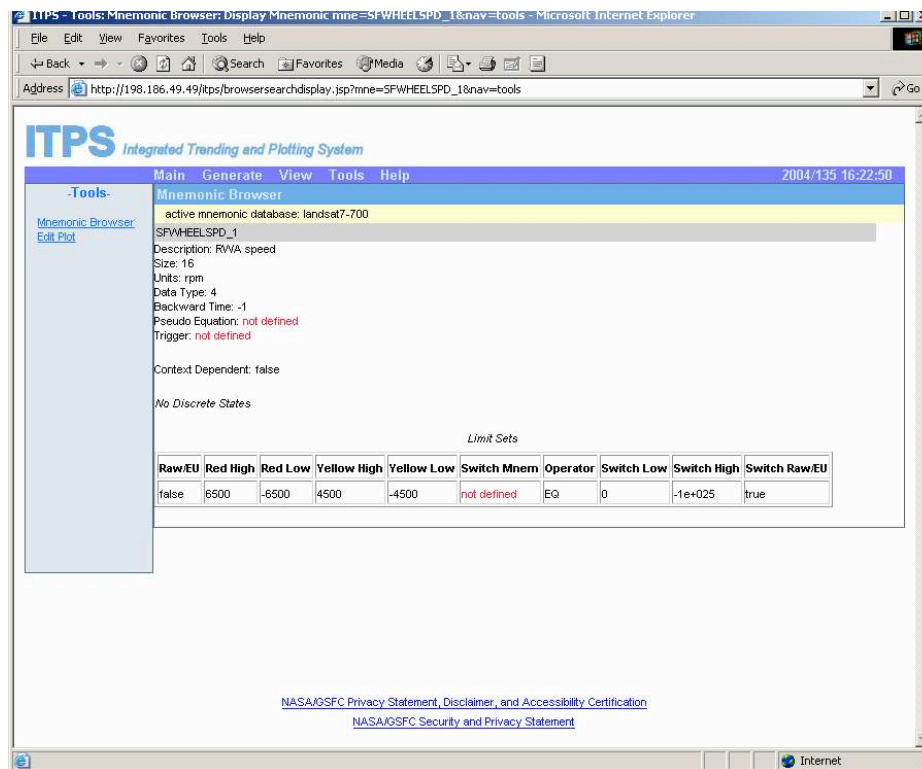


Figure 140: Mnemonic Browser Mnemonic Info

Appendix A IDF Format

An IDF must exist in order to generate plots and Mnemonic, Statistic and Mnemonic Change reports. IDFs should be created with the IDF Editor tool (see 5.3). If a user chooses to create an IDF manually using a text editor it is strongly recommended the IDF be verified for correctness using the IDF Verify utility (Section 8.6).

IDF Format

An IDF must have a file extension of .idf.

The IDF filename may not contain any spaces. In addition, Windows disallows the "?", "*", "/", "\", ".", ":", "<", ">", and "|".

An IDF consists individual lines of Input Definitions. An Input Definition is formatted as:

```
Mnem_Name|Filter|Threshold|Format|Sampling|Orbit|Statistics|Page|Graph|TripCount|TripTime|TimeExpansion
```

where:

Mnem_Name =

A Mnemonic Name. The mnemonic or pseudo-mnemonic must be in the ITPS Decom Mnemonic Database file (see Section 7.1 and Section 7.2).

Filter =

A condition telemetry expression. Currently supports: ">", "<", ">=", "<=", "!=", "=", "OR", "AND", decimals, and mnemonics. The mnemonic named in the filter field must exist in the mission Decom Mnemonic Database.

Threshold =

A condition to test if the absolute value of the difference between successive samples of a mnemonic is greater than the positive threshold decimal value. For mnemonics that use the DMDB delta limit instead of the IDF threshold limits, set this value to -2 for yellow DMDB limits, and -1 for DMDB red limits. To use DMDB-defined trip counts for the mnemonic, the value is set to -5 for yellow DMDB limits and -4 for red DMDB limits.

Format =

Data format for display can be one of the following:

IDF Entry	Format	Description
-----------	--------	-------------

"RAW, BIN"	Raw, Binary	Right-justified, with leading zeroes, base- 2 representation of raw telemetry bits.
"RAW, DEC"	Raw, Decimal	Right-justified base-10 representation with no leading zeroes.
"RAW, HEX"	Raw, Hexadecimal	Right-justified, with leading zeroes, base-16 representation of raw telemetry bits
"EU,D EC"	Eng. Unit, Decimal	classic, floating point, (no exponential notation) representation of engineering unit
"~"	ignore	Default to "EU,DEC".

Sampling = A sampling rate defined with an integer value. The very first value for a mnemonic encountered in the data stream is always displayed. After that the sampling rate will determine if subsequent values are displayed.

Orbit = Orbital Evaluations, can be:

"AN,DAY" (ascending, day) ,
 "AN,NITE" (ascending, night),
 "DN,DAY" (descending, day),
 "DN,NITE",
 "ORB,DAY" (ascending, day),
 "ORB,NITE" (descending, night),
 "AN",
 "DN",
 "DAY",
 "NITE",
 "ORB" (ascending)
 "~" (default).

Statistics = A combination of comma delimited MAX, MIN, MEAN, SD (for standard deviation).

Page (for plotting) =
 Page number for plot or "~" .

Graph (for plotting)=
 Graph number (on page) or "~" .

Trip Count = Minimum number (2-1024) of consecutive telemetry points that a condition telemetry expression must remain true before the mnemonic values will be displayed.

Time Count = Minimum amount of seconds (1-3600) of consecutive telemetry points that a condition telemetry expression must remain true before the mnemonic values will be displayed.

Time Expansion = A time-expansion range that displays all values before and after a condition telemetry expression that causes mnemonic values to be displayed. This range can be between 1-3600 seconds.

A Mnemonic Name must be defined for each line. All other parameter values are optional. If a value is not defined, a "~" must be placed in the appropriate location to signify it is blank. Some examples of this are listed below:

TACSSYPITACSSYP>3.5|~|~|~|~|~|~|~|~|~|~
TACSASTI~|3IRAW,HEX|5IAN,DAY|~|~|~|~|~|~|~|~

Below is an example of a valid IDF entry:

TACSAM14VAI(TACSAM14VA>-15) AND
(TACSAM14VA<0)|1|~|~|~IMAX.MIN|~|~|~|~

There are no spaces allowed within the fields with the exception of the *filter* field. The spaces in the *filter* field are only allowed in separating the conditions from AND or OR Boolean expressions. Values such as "TACSSYP |" or "| 5 |" will cause errors.

Every Mnemonic Name must exist in the Mnemonic Database. Mnemonic names are defined in the first field of each line starting after the first line.

A.1 Order of Precedence

The order of precedence of filtering and screening operation for generating Mnemonic Report or a Statistics Report in ITPS is as follows:

- | | |
|-------------|--|
| Filter - | A mnemonic is first filtered using the conditional operators of the “filter” field. |
| Orbital - | Orbital evaluations are applied only to mnemonics satisfying filter criteria in step 1. |
| Threshold - | Threshold comparisons are only done between the values of the mnemonics, which have passed through filter and orbital criteria. |
| Sampling - | Sampling rate is then applied to the mnemonics satisfying the filtering conditions, orbital parameters, and threshold comparisons. |

Appendix B ITPS Configuration and Properties

B.1 ITPS Property Settings

ITPS utilizes a set of configuration settings which controls the behavior of ITPS. These settings should only be modified using the “Tools” | “Properties” “Properties” menu item of the ITPS Main Interface. This menu item provides an interface into the ITPS.ini file (located in the same directory as the ITPS executable files). The “Properties” are normally set upon installation and do not have to be modified for the life of the mission.

Note: It is strongly recommended that changes to ITPS “Properties” only be done via the “Tools” | “Properties” “Properties” menu item of the ITPS Main Interface. Direct access to the ITPS.ini file should not be attempted.

Some users may not have the level of privilege required to make changes to properties. Only users that belong to the ITPS group MOC-Power may change properties. Other users should see the ITPS system administrator to make changes to properties (see Appendix E for more on ITPS groups and capabilities).

Note: Some of the properties are ‘grayed out’ and will not be in effect until future releases

These properties are categorized in seven groups, explained below:

- General
- Decom
- Ingest
- Paths
- Plots
- Print
- Other

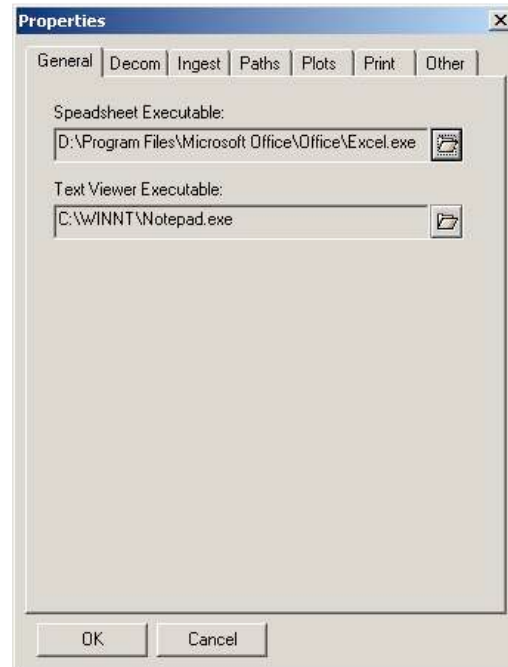


Figure 141: ITPS Properties – General

General:	
Property	Description
Spreadsheet Executable	Executable name and full path for program to display comma delimited files as tables.
Text Viewer Executable	Executable name and full path for program to display text files.

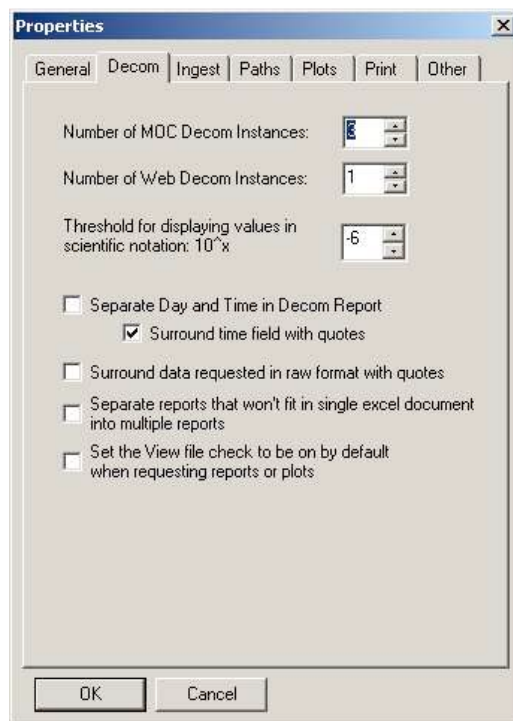


Figure 142: ITPS Properties – Decom

Decom:	
Property	Description
MOC Decom Instances	Maximum number of simultaneous MOC decom jobs to launch.
Web Decom Instances	Maximum number of simultaneous web initiated decom jobs to launch.
Scientific Notation Threshold	The exponent value for number of decimal places to display before printing report values in scientific notation (such that a -6 indicates that values with more 6 decimal places be converted to scientific notation. Value must be between -1 and -10. at for the value which report values
Separate Day from Time	List mnemonic timestamps as two comma separated values for display in two columns doy, hh:mm:ss.msec. Default is doy-hh:mm:ss.msec.
Surround time field with quotes	Preserve formatting when selecting to Separate Day from Time, by surrounding time with double quotes (and precede with "=") so that Excel will not interpret the time as a number.

Decom:	
Property	Description
Surround raw data by quotes	Preserve raw value formatting by surrounding value with double quotes (and precede with "=") so that Excel will not interpret and convert the value.
Auto-Split reports	Split CSV report output files into smaller files when report contains more than 255 columns or 65534 rows (which is the maximum Excel can hold).
Set View File On	Put checkmark on plot and report Display Upon Completion submit screen option.

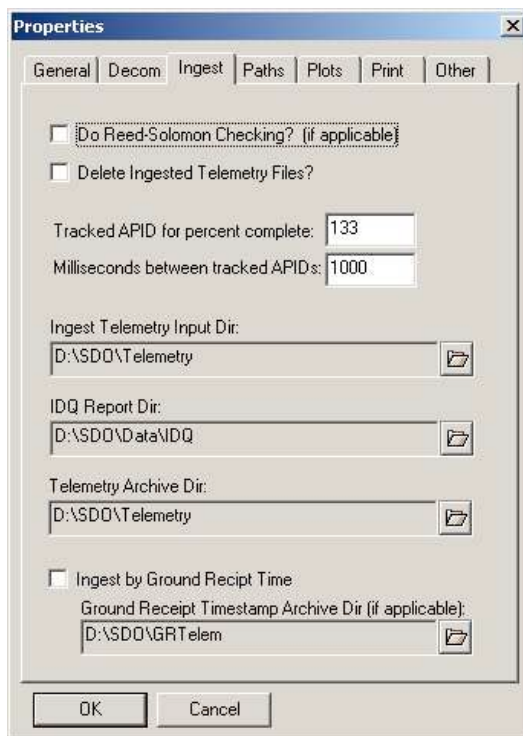


Figure 143: ITPS Properties – Ingest

Ingest	
Property	Description
Do Reed-Solomon Checking	Flag indicating whether future runs of Ingest should detect and attempt to correct RS errors (for missions that have RS error correction codes embedded with their telemetry). (This variable only takes effect when Ingest is restarted or restarted after a Pause.)

Ingest	
Property	Description
Delete Ingested Telemetry Files	Flag to control automatic deletion of source telemetry files once Ingest has completed processing of the files and created corresponding Archive files. <i>NOTE: Control of this flag is restricted to users that belong to the MS Windows group MOC-POWER (see Appendix E for more on ITPS groups and capabilities).</i>
Tracked APID	APID number to be used to determine capture rate daily percent complete. Used in conjunction with "Milliseconds between tracked APIDs" property.
Milliseconds between tracked APIDs	Maximum tolerated gap between successive tracked packets used to determine data gaps and daily capture percent. Works in conjunction with "Tracked APID" property.
Ingest Telemetry Input Dir	Directory from which Ingest should read input mission telemetry files.
IDQ Report Dir	Directory into which Ingest writes individual Archive file data quality and gap reports.
Telemetry Archive Dir	Ingest output directory. Default directory ITPS Report, LTT programs, etc. search for ITPS Archive data.
Ingest Ground Receipt Time	Activate storage by ground receipt time (in addition to spacecraft time). This option is only valid for missions where this feature has been explicitly implemented.
Ground Receipt Timestamp Dir	Ingest output directory for ground-receipt timestamped data



Figure 144: ITPS Properties - Paths

Paths:	
Property	Description
IDF Dir	Default directory in which ITPS will look for IDFs.
TDF Dir	Default directory in which ITPS will look for TDF files.
Mnemonic Database Dir	Default directory in which the ITPS internal Mnemonic databases are found. Also the directory into which ITPS places newly created ITPS Mnemonic databases.
Report Output Dir	Default directory into which ITPS reports are written.
PDB \ ODB Dir	Default directory from which ITPS reads mission PDB or ODB files for creation of Mnemonic Database.
Request Dir	Default directory for report request files.

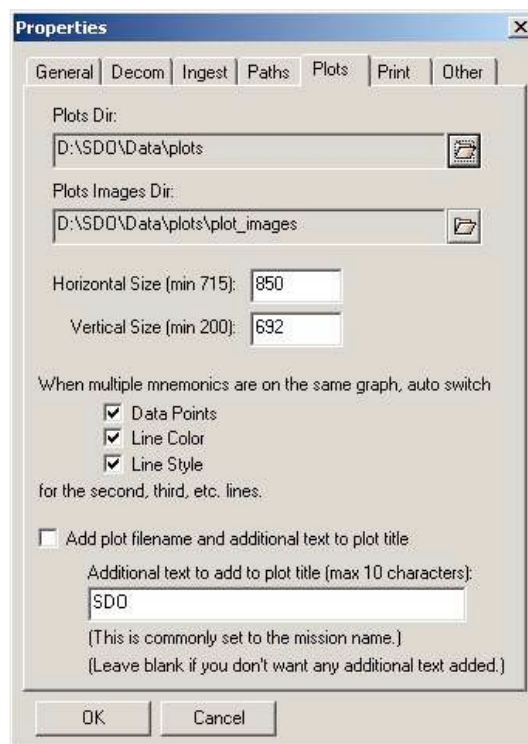


Figure 145: ITPS Properties - Plots

Plots	
Property	Description
Plots Dir	Full path to location of ITPS generated plot definition files.
Plot Images Dir	Output directory for Interactive Plots generated plot image files (see Section 3.5.4).
Horizontal Size	Default Interactive Plots horizontal window size (in pixels). Must be greater or equal to 715 pixels. Maximum is based on the resolution of the monitor.
Vertical Size	Default Interactive Plots vertical window size (in pixels). Must be greater or equal to 200 pixels. Maximum is based on resolution of the monitor.
Auto Switch Data Points, Line Color, Line Style	Automatically differentiate between plot lines when more than one line is displayed on a graph. See Section B.4 for details regarding these settings.
Add Plot Filename and text to plot titles	Automatically add plot filename (and optional additional text) to the title of printed plot pages.

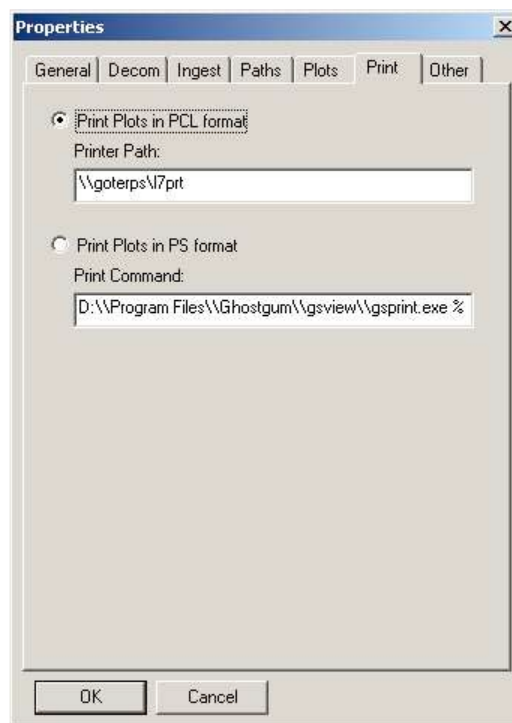


Figure 146: ITPS Properties - Print

Print	
Property	Description
PrintType	PS (for Postscript) or PCL
PrinterPath	Path for Pvwave to print plots. This setting must be a printer that is set up as a shared device – even if it is local.
Print Command	Setting to use to facilitate printing in Postscript format. This command should normally be set to the DOS print command using the format designated above. Users may use this parameter to designate a third party graphics printing program.

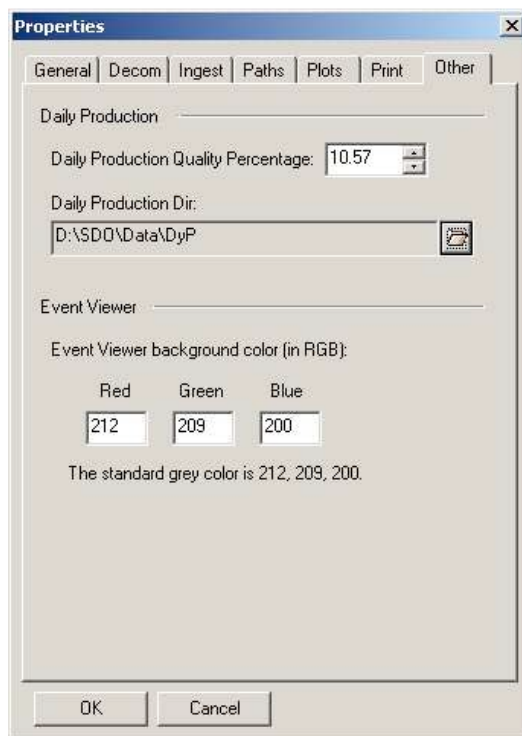


Figure 147: ITPS Properties – Other

Other	
Property	Description
Daily Production Quality Percentage	Percent of expected daily telemetry volume required to allow Daily Production to run.
Daily Production Dir	Directory where daily production requests are stored.
Event Viewer Background colors	Background color for event viewer (and AIDQ window) viewer window. Comma separated red, green and blue values (0-255). Example: 212,209,200

B.2 Miscellaneous ITPS.ini Properties

There are a number of ITPS.ini file properties that as yet do not have corresponding user interface controls, but are noteworthy. It is anticipated that these will be added to the Tools | Properties screen as time allows. They are described here so that an authorized user shall be able to modify them based on mission needs.

INI Heading	Property	Description	Values
-------------	----------	-------------	--------

ITPS System Users' Guide –Appendix B ITPS Configuration and Properties

[ITPS]	UseGMSEC	Flag to activate GMSEC capabilities (see Appendix B.3	0 (Deactivate) 1 (Activate) IMPORTANT NOTE: Activating GMSEC when there is no GMSEC bus available may cause ITPS to become unstable (or worse!).
[ITPS]	SeparatedOY	List ASCII Reports day-of-year in separate column (separate with comma) (default is to print date as unified day and time: 201-00:40:16.720).	0 (Combined) 1 (Separate)
[ITPS]	BinHexString	Allows binary and hexadecimal values in CSV files to be viewed as literals (surrounded by double-quotes) so Excel will not try to convert them.	0 (unquoted) 1 (quoted)
[ITPS]	MultiOutputFiles	Splits CSV report output files in individual files when reports contain more than 255 columns or 65534 rows (which is the maximum Excel can hold).	0 (single file) 1 (split to multiple files)
[ITPS]	File_View	Set default on plot and report request screens to "View Plot" and "View Report" upon job completion.	0 (Set default to not View) 1 (Set default to View)
[ITPS]	NewPlotTitle	Prefixes a title or mission name in front of plot names on printed plot pages. Works in conjunction with property [ITPS]IMissionName.	0 (no plot name prefix) 1 (prefix plot name)

ITPS System Users' Guide –Appendix B ITPS Configuration and Properties

[ITPS]	MissionName	In conjunction with property [ITPS]INewPlotTitle, puts a prefix in front of printed plot names.	Text prefix or mission name (example "SDO", or "GLAST").
[ITPS]	EventViewerBGColorRGBCode	Background color for event viewer (and AIDQ window) viewer window.	Comma separated red, green and blue values (0-255). Example: 212,209,200
[ITPS]	UseGRTime	Controls whether data should be stored by ground receipt time (in addition to spacecraft time). This option is only valid for missions where this feature has been explicitly implemented (if you're not sure, then it probably isn't).	0 (don't ingest by ground receipt time) 1 (ingest by ground receipt time too).
[Ingest]	APIDFILE	For missions that have configurable CCSDS APID selection, file that contains selected APIDs (for use in APID Configurator tool (see <i>Section 9.5</i>).	Fully qualified drive, path and filename.
[Ingest]	InvalidAPIDFileTimeout	Controls how often a warning message is to be generated if there is no APIDFILE property set up.	Warning message interval – in minutes.
[Ingest]	Tracked_APID	APID number to be used to determine capture rate daily percent complete. Used in conjunction with MSecsBetweenIDs property.	APID number (in decimal).

[Ingest]	MSecsBetweenIDs	Expected gap between successive tracked packets used to determine data gaps and daily capture percent. Works in conjunction with Tracked_APIID property.	Acceptable interval between packets in milliseconds.
[STKAddition]	StartSTKThread	Flag to activate ingestion of STK files.	0 (Deactivate) 1 (Activate)
[STKAddition]	STKDataDirectory	Input location for source STK data.	Fully qualified drive, path.
[STKAddition]	AnodePatternMatch	Expected pattern (including wildcards) of ANODE STK files, so they can be recognized and processed.	Example: GLAST_*_ITPS_ASCENDING_NODE_*.txt
[STKAddition]	DnodePatternMatch=GLAST_*_ITPS_DESCENDING_NODE_*.txt	Expected pattern (including wildcards) of DNODE STK files, so they can be recognized and processed.	Example: GLAST_*_ITPS_DESCENDING_NODE_*.txt
[STKAddition]	ShadowPatternMatch=GLAST_*_ITPS_LIGHTING_TIMES_*.txt	Expected pattern (including wildcards) of shadow (eclipse) STK files, so they can be recognized and processed.	Example: GLAST_*_ITPS_LIGHTING_TIMES_*.txt
[STKAddition]	AnodeReplaceStr=ASCENDING	Portion of ascending node filenames that is to be ignored when trying to find matching pairs of ascending and descending node files.	ASCENDING

[STKAddition]	DnodeReplaceStr=DESCENDING	Portion of descending node filenames that is to be ignored when trying to find matching pairs of ascending and descending node files.	DESCENDING
[STKAddition]	OrbitDiffAllowed=10	The number of divergent orbits (lines) in the ascending and descending node files that can be ignored when trying to detect matching pairs before the files are declared out of sync.	Integer number

B.3 ITPS.ini GMSEC Properties

Some ITPS missions utilize the GMSEC bus and components to communicate with other MOC entities. In addition, some installations receive telemetry via the GMSEC bus. The functionality of ITPS GMSEC components is controlled by the [GMSEC_DATA_VALUES] and [GMSEC] group of properties. There is no user interface for configuring these properties which is best done in coordination with ITPS developers, and correlated with the interface specifications determined by the other mission GMSEC-connected elements.

Variable Name	Description	Default
[GMSEC_DATA_VALUES] DisplayGmsecDataValuesOption	1 - ITPS request submit screens should display the gmsec/local data option. Anything but '1' if they shouldn't.	Not 1

Variable Name	Description	Default
[GMSEC_DATA_VALUES] UseLocalData	0 - if ITPS should use Gmsec data for analysis requests, Anything else if it should use local data.	Not 0
[GMSEC_DATA_VALUES] DecomConfigFile=G:\gmsec_data_request.xml	Full path and name to the GMSEC configuration file	NA – must be set.
[GMSEC_DATA_VALUES] DecomConfigToUse=config1	The designation of which configuration in the DecomConfigFile file to use	NA – must be set.
[GMSEC_DATA_VALUES] DecomSubscribeToUse=sub1	The designation of which subscription in the DecomConfigFile file to use	NA – must be set.
[GMSEC_DATA_VALUES] DecomMessageToUse=msg1	The designation of which message in the DecomConfigFile file to use	NA – must be set.
[GMSEC_DATA_VALUES] MessageDataField=DATA	The designation of the field in the reply gmsec message where the data is located.	NA – must be set.
[GMSEC_DATA_VALUES] WindowsNewLines=1	1 - if the data has windows return characters (0x130A) for a new line, Anything else if it has unix characters (0x0A)	Not 1
[GMSEC_DATA_VALUES] DecomWaitForReplyTimeout=120	Timeout in minutes for which ITPS should wait for a reply from GMSEC for its data request.	120

[GMSEC] EventConfigName=EventService	Name for use in event generated messages
[GMSEC] EventConfigRetrySeconds=60	Time in seconds to wait before retry if can't connect to bus
[GMSEC] EventConfigHeartbeatSeconds=30	The number of seconds to wait between sending the heartbeat message
[GMSEC] EventConfigCFCount=3	Number of parameters to configure the heartbeat connection to

[GMSEC] EventConfigCFDescName1=connectionType	First parameter name
[GMSEC] EventConfigCFValue1=gmsec_mb	First parameter value
[GMSEC] EventConfigCFDescName2=port	Second parameter name
[GMSEC] EventConfigCFValue2=9000	Second parameter value
[GMSEC] EventConfigCFDescName3=server	Third parameter name
[GMSEC] EventConfigCFValue3=terpsrule.honeywell-tsi.com	Third parameter value
[GMSEC] EventConfigMessCount=7	Number of parameters in the heartbeat message to be send out
[GMSEC] EventConfigMess1=GMSEC	First parameter of the heartbeat message to send
[GMSEC] EventConfigMess2=GLAST	Second parameter of the heartbeat message to send
[GMSEC] EventConfigMess3=STV	Third parameter of the heartbeat message to send
[GMSEC] EventConfigMess4=MSG	Fourth parameter of the heartbeat message to send
[GMSEC] EventConfigMess5=C2CX	Fifth parameter of the heartbeat message to send
[GMSEC] EventConfigMess6=ITPS	Sixth parameter of the heartbeat message to send
[GMSEC] EventConfigMess7=HB	Seventh parameter of the heartbeat message to send
[GMSEC] EventConfigFieldCount=8	Number of fields to set in the message to be sent
[GMSEC] EventConfigFieldDescName1=HEADER-VERSION	First field name of the message to be sent
[GMSEC] EventConfigFieldValue1=1.0	First field value of the message to be sent
[GMSEC] EventConfigFieldType1=FLOAT	First field type of the message to be sent
[GMSEC] EventConfigFieldDescName2=MESSAGE-TYPE	Second field name of the message to be sent
[GMSEC] EventConfigFieldValue2=MSG	Second field value of the message to be sent
[GMSEC] EventConfigFieldType2=STRING	Second field type of the message to be sent
[GMSEC] EventConfigFieldDescName3=MESSAGE-SUBTYPE	Third field name of the message to be sent
[GMSEC] EventConfigFieldValue3=C2CX	Third field value of the message to be sent

[GMSEC] EventConfigFieldType3=STRING	Third field type of the message to be sent
[GMSEC] EventConfigFieldDescName4=MISSION-ID	Fourth field name of the message to be sent
[GMSEC] EventConfigFieldValue4=GLAST	Fourth field value of the message to be sent
[GMSEC] EventConfigFieldType4=STRING	Fourth field type of the message to be sent
[GMSEC] EventConfigFieldDescName5=C2CX-SUBTYPE	Fifth field name of the message to be sent
[GMSEC] EventConfigFieldValue5=HB	Fifth field value of the message to be sent
[GMSEC] EventConfigFieldType5=STRING	Fifth field type of the message to be sent
[GMSEC] EventConfigFieldDescName6=NODE	Sixth field name of the message to be sent
[GMSEC] EventConfigFieldValue6=ITPS_MSG	Sixth field value of the message to be sent
[GMSEC] EventConfigFieldType6=STRING	Sixth field type of the message to be sent
[GMSEC] EventConfigFieldDescName7=COMPONENT	Seventh field name of the message to be sent
[GMSEC] EventConfigFieldValue7=ITPS	Seventh field value of the message to be sent.
[GMSEC] EventConfigFieldType7=STRING	Seventh field type of the message to be sent.
[GMSEC] EventConfigFieldDescName8=CONTENT-VERSION	Eighth field name of the message to be sent
[GMSEC] EventConfigFieldValue8=1.0	Eighth field value of the message to be sent.
[GMSEC] EventConfigFieldType8=FLOAT	Eighth field type of the message to be sent.
[GMSEC] RequeConfigName=RequestQueueService	Name for use in request queue generated messages
[GMSEC] RequeConfigRetrySeconds=60	Time in seconds to wait before retry if can't connect to bus
[GMSEC] RequeConfigHeartbeatSeconds=30	The number of seconds to wait between sending the heartbeat message
[GMSEC] RequeConfigCFCount=3	Number of parameters to configure the connection to
[GMSEC] RequeConfigCFDescName1=connectionType	First parameter name
[GMSEC] RequeConfigCFValue1=gmsec_mb	First parameter value

[GMSEC] RequeConfigCFDescName2=port	Second parameter name
[GMSEC] RequeConfigCFValue2=9000	Second parameter value
[GMSEC] RequeConfigCFDescName3=server	Third parameter name
[GMSEC] RequeConfigCFValue3=terpsrule.honeywell-tsi.com	Third parameter value
[GMSEC] RequeConfigMessCount=7	Number of parameters in the heartbeat message to send out
[GMSEC] RequeConfigMess1=GMSEC	First parameter of the heartbeat message to send
[GMSEC] RequeConfigMess2=GLAST	Second parameter of the heartbeat message to send
[GMSEC] RequeConfigMess3=STV	Third parameter of the heartbeat message to send
[GMSEC] RequeConfigMess4=MSG	Fourth parameter of the heartbeat message to send
[GMSEC] RequeConfigMess5=C2CX	Fifth parameter of the heartbeat message to send
[GMSEC] RequeConfigMess6=ITPS2	Sixth parameter of the heartbeat message to send
[GMSEC] RequeConfigMess7=HB	Seventh parameter of the heartbeat message to send
[GMSEC] RequeConfigFieldCount=8	Number of fields to set in the message to be sent
[GMSEC] RequeConfigFieldDescName1=HEADER-VERSION	First field name of the message to be sent
[GMSEC] RequeConfigFieldValue1=1.0	First field value of the message to be sent
[GMSEC] RequeConfigFieldType1=FLOAT	First field type of the message to be sent
[GMSEC] RequeConfigFieldDescName2=MESSAGE-TYPE	Second field name of the message to be sent
[GMSEC] RequeConfigFieldValue2=MSG	Second field value of the message to be sent
[GMSEC] RequeConfigFieldType2=STRING	Second field type of the message to be sent
[GMSEC] RequeConfigFieldDescName3=MESSAGE-SUBTYPE	Third field name of the message to be sent
[GMSEC] RequeConfigFieldValue3=C2CX	Third field value of the message to be sent
[GMSEC] RequeConfigFieldType3=STRING	Third field type of the message to be sent
[GMSEC] RequeConfigFieldDescName4=MISSION-ID	Fourth field name of the message to be sent

[GMSEC] RequeConfigFieldValue4=GLAST	Fourth field value of the message to be sent
[GMSEC] RequeConfigFieldType4=STRING	Fourth field type of the message to be sent
[GMSEC] RequeConfigFieldDescName5=C2CX-SUBTYPE	Fifth field name of the message to be sent
[GMSEC] RequeConfigFieldValue5=HB	Fifth field value of the message to be sent
[GMSEC] RequeConfigFieldType5=STRING	Fifth field type of the message to be sent
[GMSEC] RequeConfigFieldDescName6=NODE	Sixth field name of the message to be sent
[GMSEC] RequeConfigFieldValue6=ITPS2_MSG	Sixth field value of the message to be sent
[GMSEC] RequeConfigFieldType6=STRING	Sixth field type of the message to be sent
[GMSEC] RequeConfigFieldDescName7=COMPONENT	Seventh field name of the message to be sent
[GMSEC] RequeConfigFieldValue7=ITPS2	Seventh field value of the message to be sent.
[GMSEC] RequeConfigFieldType7=STRING	Seventh field type of the message to be sent.
[GMSEC] RequeConfigFieldDescName8=CONTENT-VERSION	Eighth field name of the message to be sent
[GMSEC] RequeConfigFieldValue8=1.0	Eighth field value of the message to be sent.
[GMSEC] RequeConfigFieldType8=FLOAT	Eighth field type of the message to be sent.
[GMSEC] IngestConfigName=IngestService	Name for use in ingest service generated messages
[GMSEC] IngestConfigRetrySeconds=60	Time in seconds to wait before retry if can't connect to bus
[GMSEC] IngestConfigHeartbeatSeconds=30	The number of seconds to wait between sending the heartbeat message
[GMSEC] IngestConfigCFCount=3	Number of parameters to configure the connection to
[GMSEC] IngestConfigCFDescName1=connectionType	First parameter name
[GMSEC] IngestConfigCFValue1=gmsecmb	First parameter value
[GMSEC] IngestConfigCFDescName2=port	Second parameter name
[GMSEC] IngestConfigCFValue2=9000	Second parameter value
[GMSEC] IngestConfigCFDescName3=server	Third parameter name

[GMSEC] IngestConfigCFValue3=terps rule.honeywell-tsi.com	Third parameter value
[GMSEC] IngestConfigMessCount=7	Number of parameters in the heartbeat message to send out
[GMSEC] IngestConfigMess1=GMSEC	First parameter of the heartbeat message to send
[GMSEC] IngestConfigMess2=GLAST	Second parameter of the heartbeat message to send
[GMSEC] IngestConfigMess3=STV	Third parameter of the heartbeat message to send
[GMSEC] IngestConfigMess4=MSG	Fourth parameter of the heartbeat message to send
[GMSEC] IngestConfigMess5=C2CX	Fifth parameter of the heartbeat message to send
[GMSEC] IngestConfigMess6=ITPS3	Sixth parameter of the heartbeat message to send
[GMSEC] IngestConfigMess7=HB	Seventh parameter of the heartbeat message to send
[GMSEC] IngestConfigFieldCount=8	Number of fields to set in the heartbeat message to be sent
[GMSEC] IngestConfigFieldDescName1=HEADER-VERSION	First field name of the message to be sent
[GMSEC] IngestConfigFieldValue1=1.0	First field value of the message to be sent
[GMSEC] IngestConfigFieldType1=FLOAT	First field type of the message to be sent
[GMSEC] IngestConfigFieldDescName2=MESSAGE-TYPE	Second field name of the message to be sent
[GMSEC] IngestConfigFieldValue2=MSG	Second field value of the message to be sent
[GMSEC] IngestConfigFieldType2=STRING	Second field type of the message to be sent
[GMSEC] IngestConfigFieldDescName3=MESSAGE-SUBTYPE	Third field name of the message to be sent
[GMSEC] IngestConfigFieldValue3=C2CX	Third field value of the message to be sent
[GMSEC] IngestConfigFieldType3=STRING	Third field type of the message to be sent
[GMSEC] IngestConfigFieldDescName4=MISSION-ID	Fourth field name of the message to be sent
[GMSEC] IngestConfigFieldValue4=GLAST	Fourth field value of the message to be sent
[GMSEC] IngestConfigFieldType4=STRING	Fourth field type of the message to be sent
[GMSEC] IngestConfigFieldDescName5=C2CX-SUBTYPE	Fifth field name of the message to be sent

[GMSEC] IngestConfigFieldValue5=HB	Fifth field value of the message to be sent
[GMSEC] IngestConfigFieldType5=STRING	Fifth field type of the message to be sent
[GMSEC] IngestConfigFieldDescName6=NODE	Sixth field name of the message to be sent
[GMSEC] IngestConfigFieldValue6=ITPS3_MSG	Sixth field value of the message to be sent
[GMSEC] IngestConfigFieldType6=STRING	Sixth field type of the message to be sent
[GMSEC] IngestConfigFieldDescName7=COMPONENT	Seventh field name of the message to be sent
[GMSEC] IngestConfigFieldValue7=ITPS3	Seventh field value of the message to be sent.
[GMSEC] IngestConfigFieldType7=STRING	Seventh field type of the message to be sent.
[GMSEC] IngestConfigFieldDescName8=CONTENT-VERSION	Eighth field name of the message to be sent
[GMSEC] IngestConfigFieldValue8=1.0	Eighth field value of the message to be sent.
[GMSEC] IngestConfigFieldType8=FLOAT	Eighth field type of the message to be sent.
[GMSEC] MessServiceName=GMSEC message Service HB	Name for use in GMSEC message service generated messages
[GMSEC] MessServiceRetrySeconds=60	Time in seconds to wait before retry if can't connect to bus
[GMSEC] MessServiceHeartbeatSeconds=30	The number of seconds to wait between sending the heartbeat message
[GMSEC] MessServiceCFCount=3	Number of parameters to configure the connection to
[GMSEC] MessServiceCFDescName1=connectionType	First parameter name
[GMSEC] MessServiceCFValue1=gmsec_mb	First parameter value
[GMSEC] MessServiceCFDescName2=port	Second parameter name
[GMSEC] MessServiceCFValue2=9000	Second parameter value
[GMSEC] MessServiceCFDescName3=server	Third parameter name
[GMSEC] MessServiceCFValue3=terpsrule.honeywell-tsi.com	Third parameter value
[GMSEC] MessServiceMessCount=7	Number of parameters in the heartbeat message to send out
[GMSEC] MessServiceMess1=GMSEC	First parameter of the heartbeat message to send

[GMSEC] MessServiceMess2=GLAST	Second parameter of the heartbeat message to send
[GMSEC] MessServiceMess3=STV	Third parameter of the heartbeat message to send
[GMSEC] MessServiceMess4=MSG	Fourth parameter of the heartbeat message to send
[GMSEC] MessServiceMess5=C2CX	Fifth parameter of the heartbeat message to send
[GMSEC] MessServiceMess6=ITPS4	Sixth parameter of the heartbeat message to send
[GMSEC] MessServiceMess7=HB	Seventh parameter of the heartbeat message to send
[GMSEC] MessServiceFieldCount=8	Number of fields to set in the message to be sent
[GMSEC] MessServiceFieldDescName1=HEADER-VERSION	First field name of the message to be sent
[GMSEC] MessServiceFieldValue1=1.0	First field value of the message to be sent
[GMSEC] MessServiceFieldType1=FLOAT	First field type of the message to be sent
[GMSEC] MessServiceFieldDescName2=MESSAGE-TYPE	Second field name of the message to be sent
[GMSEC] MessServiceFieldValue2=MSG	Second field value of the message to be sent
[GMSEC] MessServiceFieldType2=STRING	Second field type of the message to be sent
[GMSEC] MessServiceFieldDescName3=MESSAGE-SUBTYPE	Third field name of the message to be sent
[GMSEC] MessServiceFieldValue3=C2CX	Third field value of the message to be sent
[GMSEC] MessServiceFieldType3=STRING	Third field type of the message to be sent
[GMSEC] MessServiceFieldDescName4=MISSION-ID	Fourth field name of the message to be sent
[GMSEC] MessServiceFieldValue4=GLAST	Fourth field value of the message to be sent
[GMSEC] MessServiceFieldType4=STRING	Fourth field type of the message to be sent
[GMSEC] MessServiceFieldDescName5=C2CX-SUBTYPE	Fifth field name of the message to be sent
[GMSEC] MessServiceFieldValue5=HB	Fifth field value of the message to be sent
[GMSEC] MessServiceFieldType5=STRING	Fifth field type of the message to be sent
[GMSEC] MessServiceFieldDescName6=NODE	Sixth field name of the message to be sent

[GMSEC] MessServiceFieldValue6=ITP S4_MSG	Sixth field value of the message to be sent
[GMSEC] MessServiceFieldType6=STRI NG	Sixth field type of the message to be sent
[GMSEC] MessServiceFieldDescName7= COMPONENT	Seventh field name of the message to be sent
[GMSEC] MessServiceFieldValue7=ITP S4	Seventh field value of the message to be sent.
[GMSEC] MessServiceFieldType7=STRI NG	Seventh field type of the message to be sent.
[GMSEC] MessServiceFieldDescName8= CONTENT-VERSION	Eighth field name of the message to be sent
[GMSEC] MessServiceFieldValue8=1.0	Eighth field value of the message to be sent.
[GMSEC] MessServiceFieldType8=FLOA T	Eighth field type of the message to be sent.
[GMSEC] LogConfigName=Log Messages	Name for use in logger generated error messages
[GMSEC] LogConfigRetrySeconds=60	Time in seconds to wait before retry if can't connect to bus
[GMSEC] LogConfigCFCount=3	Number of parameters to configure the connection to
[GMSEC] LogConfigCFDescName1=conne ctionType	First parameter name
[GMSEC] LogConfigCFValue1=gmsec_mb	First parameter value
[GMSEC] LogConfigCFDescName2=port	Second parameter name
[GMSEC] LogConfigCFValue2=9000	Second parameter value
[GMSEC] LogConfigCFDescName3=serve r	Third parameter name
[GMSEC] LogConfigCFValue3=terpsrul e.honeywell-tsi.com	Third parameter value
[GMSEC] LogConfigMessCount=5	Number of parameters in the log message to send out
[GMSEC] LogConfigMess1=GMSEC	First parameter of the message to send
[GMSEC] LogConfigMess2=GLAST	Second parameter of the message to send
[GMSEC] LogConfigMess3=STV	Third parameter of the message to send
[GMSEC] LogConfigMess4=MSG	Fourth parameter of the message to send
[GMSEC] LogConfigMess5=LOG	Fifth parameter of the message to send
[GMSEC] LogConfigFieldCount=7	Number of fields to set in the message to be sent

ITPS System Users' Guide –Appendix B ITPS Configuration and Properties

[GMSEC] LogConfigFieldDescName1=HEADER-VERSION	First field name of the message to be sent
[GMSEC] LogConfigFieldValue1=1.0	First field value of the message to be sent
[GMSEC] LogConfigFieldType1=FLOAT	First field type of the message to be sent
[GMSEC] LogConfigFieldDescName2=MESSAGE-TYPE	Second field name of the message to be sent
[GMSEC] LogConfigFieldValue2=MSG	Second field value of the message to be sent
[GMSEC] LogConfigFieldType2=STRING	Second field type of the message to be sent
[GMSEC] LogConfigFieldDescName3=MESSAGE-SUBTYPE	Third field name of the message to be sent
[GMSEC] LogConfigFieldValue3=LOG	Third field value of the message to be sent
[GMSEC] LogConfigFieldType3=STRING	Third field type of the message to be sent
[GMSEC] LogConfigFieldDescName4=MISSION-ID	Fourth field name of the message to be sent
[GMSEC] LogConfigFieldValue4=GLAST	Fourth field value of the message to be sent
[GMSEC] LogConfigFieldType4=STRING	Fourth field type of the message to be sent
[GMSEC] LogConfigFieldDescName5=COMPONENT	Fifth field name of the message to be sent
[GMSEC] LogConfigFieldValue5=ITPS5	Second field value of the message to be sent
[GMSEC] LogConfigFieldType5=STRING	Second field type of the message to be sent
[GMSEC] LogConfigFieldDescName6=CONTENT-VERSION	Sixth field name of the message to be sent
[GMSEC] LogConfigFieldValue6=1.0	Sixth field value of the message to be sent
[GMSEC] LogConfigFieldType6=FLOAT	Sixth field type of the message to be sent
[GMSEC] LogConfigFieldDescName7=SECURITY	Seventh field name of the message to be sent
[GMSEC] LogConfigFieldValue7=1	Seventh field value of the message to be sent
[GMSEC] LogConfigFieldType7=SHORT	Seventh field type of the message to be sent
[GMSEC] LogConfigTimeField=LOG-OR-TRACKING-TIME	Field where the current time gets set
[GMSEC] LogConfigTimeFieldType=STRING	The type of the LogConfigTimeField field

[GMSEC] LogConfigMessageField=MSG-TEXT	Field where the log message gets set
[GMSEC] LogConfigMessageType=STRING	The type of the LogConfigMessageField field
[GMSEC] EventMsgFilterCount=2	Count of different strings to filter
[GMSEC] EventMsgFilter1=IngestService:	First string to filter
[GMSEC] EventMsgFilter2=AIDQ:	Second string to filter
[GMSEC] DirectiveName=GMSEC message Service	Name for message service messages
[GMSEC] DirectiveRetrySeconds=60	Number of seconds to wait before attempting to reconnect to the GMSEC bus if it goes down.
[GMSEC] DirectiveConfigFile=G:\GLAST\Data\gmsec_cfg\gmsec_msg_service.xml	full path and name to the xml configuration file
[GMSEC] DirectiveConfigToUse=config1	which configuration in the DirectiveConfigFile xml file to use
[GMSEC] DirectiveSubscribeToUse=sub2	which subscription in the DirectiveConfigFile xml file to use
[GMSEC] DirectiveReplyToUse=msg2	which message in the DirectiveConfigFile xml file to use
[GMSEC] DirectiveSendACK=1	1 = should send an ACK message when directive message received, 0 if shouldn't
[GMSEC] DirectiveMessACKCount=8	number of fields in the ACKmessage
[GMSEC] DirectiveMessACK1=GMSEC	first field in the ACK message
[GMSEC] DirectiveMessACK2=GLAST	second field in the ACK message
[GMSEC] DirectiveMessACK3=<SAT-ID-PHYSICAL>	third field in the ACK message - If the field here is in <>, then the field is replaced with the value that comes from the name that is in the <> that is gotten from the request
[GMSEC] DirectiveMessACK4=RESP	fourth field in the ACK message
[GMSEC] DirectiveMessACK5=DIR	fifth field in the ACK message
[GMSEC] DirectiveMessACK6=<COMPONENT>	sixth field in the ACK message
[GMSEC] DirectiveMessACK7=<MSG-ID>	seventh field in the ACK message
[GMSEC] DirectiveMessACK8=ack	eighth field in the ACK message

[GMSEC] DirectiveRequestField=DIRECTIVE-STRING	the name of the field in the request where the info about the request is stored (idf name, times requested, etc)
[GMSEC] DirectiveRoutingField=DIRECTIVE-KEYWORD	name of the field in the request where the type of request is
[GMSEC] DirectiveRoutingKeyword=TR END_REQUEST	expected type in above field for directive requests
[GMSEC] GMSECUser=GMSEC	name of the user who will show up in the request for a directive request
[GMSEC] UseAutoDMDBSwitchForGMSEC=0	1= auto dmdb switching should be used for gmsec requests, 0 otherwise
[GMSEC] DyPMessageName=GMSEC DyP Service	Name for use in DyP generated messages
[GMSEC] DyPMessageRetrySeconds=60	Time in seconds to wait before retry if can't connect to bus
[GMSEC] DyPMessageConfigFile=G:\GLAST\Data\gmsec_cfg\gmsec_msg_service.xml	full path and name to the xml configuration file
[GMSEC] DyPMessageConfigToUse=config1	which configuration in the DyPMessageConfigFile xml file to use
[GMSEC] DyPMessageSubscribeToUse=sub1	which subscription in the DyPMessageConfigFile xml file to use
[GMSEC] DyPMessageReplyToUse=msg1	which message in the DyPMessageConfigFile xml file to use
[GMSEC] DyPMessageSendACK=1	1 = should send when message received, 0 if shouldn't
[GMSEC] DyPMessageMessACKCount=8	number of fields in the ACK message
[GMSEC] DyPMessageMessACK1=GMSEC	first field in the ACK message
[GMSEC] DyPMessageMessACK2=GLAST	second field in the ACK message
[GMSEC] DyPMessageMessACK3=<SAT-ID-PHYSICAL>	third field in the ACK message - If the field here is in <>, then the field is replaced with the value that comes from the name that is in the <> that is gotten from the request
[GMSEC] DyPMessageMessACK4=RESP	fourth field in the ACK message
[GMSEC] DyPMessageMessACK5=DIR	fifth field in the ACK message
[GMSEC] DyPMessageMessACK6=<COMPONENT>	sixth field in the ACK message

[GMSEC] DyPMessageMessACK7=<MSG-ID>	seventh field in the ACK message
[GMSEC] DyPMessageMessACK8=ack	eighth field in the ACK message
[GMSEC] DyPMessageRequestField=DIR ECTIVE-STRING	the name of the field in the request where the info about the request is stored (idf name, times requested, etc)
[GMSEC] DyPMessageRoutingField=DIR ECTIVE-KEYWORD	name of the field in the request where the type of request is
[GMSEC] DyPMessageRoutingKeyword=D YP_REQUEST	expected type in above field for directive requests
[GMSEC] DataServerName=GMSEC Data Server	Name for the data server messages
[GMSEC] DataServerRetrySeconds=60	Time in seconds to wait before retry if can't connect to bus
[GMSEC] DataServerConfigFile=G:\GL AST\Data\gmsec_cfg\gmsec_msg_servi ce.xml	full path and name to the xml configuration file
[GMSEC] DataServerConfigToUse=conf ig1	Name of configuration in the DataServerConfigFile to use.
[GMSEC] DataServerSubscribeToUse=s ub3	which subscription in the DataServerConfigFile xml file to use
[GMSEC] DataServerReplyToUse=msg3	which message in the DataServerConfigFile xml file to use
[GMSEC] DataServerMessACKCount=8	number of fields in the ACK message
[GMSEC] DataServerMessACK1=gmsec	first field in the ACK message
[GMSEC] DataServerMessACK2=glast	second field in the ACK message
[GMSEC] DataServerMessACK3=glast	third field in the ACK message - If the field here is in <>, then the field is replaced with the value that comes from the name that is in the <> that is gotten from the request
[GMSEC] DataServerMessACK4=RESP	fourth field in the ACK message
[GMSEC] DataServerMessACK5=amval	fifth field in the ACK message
[GMSEC] DataServerMessACK6=ITOS	sixth field in the ACK message
[GMSEC] DataServerMessACK7=<MSG-ID>	seventh field in the ACK message
[GMSEC] DataServerMessACK8=1	eighth field in the ACK message
[GMSEC] GmsecDataServerUser=GMSEC_ server	name of the user who will show up in the request for data server initiated requests

[GMSEC] DecomServerTimeOut=120	Time in minutes that the data server will timeout when waiting for the decom job to complete processing. Complete jobs would signal that the data server can read in the file and send the data back to the requesting program. When the timeout occurs, the data server will send back a failed message to the requesting program.
[GMSEC] IngestCaptureName=GMSEC Ingest Capture	name that is used in Ingest capture generated messages
[GMSEC] IngestCaptureRetrySeconds=60	time in seconds to wait before retry if can't connect to bus
[GMSEC] IngestCaptureConfigFile=G:\GLAST\Data\gmsec_cfg\gmsec_msg_service.xml	full path and name to the xml configuration file
[GMSEC] IngestCaptureConfigToUse=config1	which configuration in the above IngestCaptureConfigFile file to use
[GMSEC] IngestCaptureSubscribeToUse=sub4	which subscription in the IngestCaptureConfigFile xml file to use
[GMSEC] IngestNewFileCreationTime=5	time in minutes in which the raw data file should be closed, move to the ingest directory and a new file opened. This value must be greater than or equal to 1.
[GMSEC] IngestStreamModeToUse=15	the telemetry data can be one of 4 types (real-time, playback, simulated, test). This allows the user to filter out certain types. The value is in decimal.
[GMSEC] IngestTempDirectory=C:\winnt\Temp	full path to the temp directory where the raw data files are stored when they are being written to. This can be the same as the ingest directory.

<p>[GMSEC] GmsecProcessesToRun=14</p>	<p>This will allow the mission to only start select processes within the GmsecMessageService. Heartbeats for this service are ALWAYS started.</p> <p>Values are</p> <ul style="list-style-type: none"> 1 - only start directives 2 - only start Dyp 3 - start directives and Dyp 4 - only start data server 5 - start data server and directives 6 - start data server and DyP 7 - start all directives, DyP, and data server 8 - start ingest capture 9 - start ingest capture and directives 10 - start ingest capture and DyP 11 - start ingest capture, directives, and DyP 12 - start ingest capture and data server 13 - start ingest capture, data server, and directives 14 - start ingest capture, data server, and DyP 15 - start all four <p>(0x01 is directives, 0x02 is DyP, 0x04 is data server, 0x08 is ingest capture)</p>
---	---

B.4 Default Multiple Mnemonics per Graph ITPS.ini Settings

ITPS has a default behavior for plot line color, style and data point symbol when more than one mnemonic line is displayed on a graph. This default behavior is implementation specific.

For most missions, the default setting is to use an auto-switch scheme based on the number of mnemonics on the graph, where the default line color for the first mnemonic is black, gray for the second, blue, light blue, dark green, light green, red, and magenta, for subsequent mnemonics (in that order). Similarly, the default line style for most missions is “solid” for the first mnemonic on the graph,

“dotted” for the second, “dashed”, “dashed dotted”, “dashed dot dot dot” for subsequent mnemonics (in that order). Likewise, for most missions the default data symbol for graphs with more than one mnemonic is dot for the first mnemonic, diamond for the second and triangle, square, x, circle, plus, and star for any subsequent mnemonics.

Some implementations do not employ auto-switching and have line style, line color and data point style defaulting to “black”, “solid” and “period” regardless of the number of mnemonics displayed on the graph to activate this default behavior the following ITPS.ini properties must be set:

Plots		PlotAutoLineColorSwitch=0
Plots		PlotAutoLineStyleSwitch=0
Plots		PlotAutoDataPointStyleSwitch=0

Settings these properties to “1”, or omitting these properties from the file, will result in ITPS plotting default multi-line plots in auto-switch mode.

Appendix C Running Job Requests from the Command Line

It may be useful to run ITPS requests (such as plots, reports and LTT jobs) from the command line. This allows job requests to be scripted, or started from another computer.

The ITPS job executable (Decom.exe) takes a single argument which consists of a pipe character (“|”) separated fields. Table 1 below, describes these fields and what values they may take when submitted from the command line.

Field #	Title	Description	Value
1	Id	Used for internal job tracking.	0
2	User	Windows user login name	<Username>
3	Timestamp	Timestamp when request was made	Can be any valid timestamp. Format: MM.DD.YYYY-HH:MM:SS.mmm
4	Ini	Fully qualified location and name of ITPS ini file.	example c:\ITPS\bin\ITPS.ini
5	IDF	Fully qualified location and name of IDF used for this request	Example c:\ITPS\Data\Power.idf
6	Start	Start time of the job request	Format: yyyy/ddd/hh:mm:ss
7	Stop	Stop time of the job request	Format yyyy/ddd/hh:mm:ss
8	Output Filename	Output file - will be put in the directory specified in Tools Properties, for plots or reports	Report filename, plot filename (no directory or path) or ~ (for jobs with no output product (such as when adding data to the LTT DB)).
9	Sub Report Type	Type of product.	For reports: [ASCII MNCHANGE LIMIT STATISTIC TRIPCOUNT TRIPTIME] For plots: ASCII For LTT addition: STATISTIC LTT Extraction Plots: NONE LTT Extraction Reports: ASCII
10	TDF	Fully qualified Time Definition File path and name.	This is not used by product generation (only by the gui interface) so it should always be ~

Field #	Title	Description	Value
11	Poly	This is an old parameter that dates back to one of the first releases of LTAS and is no longer used.	Should always be ~
12	DMDB	Full path to the DMDB file to use. Ignored for auto DMDB switching job requests.	Fully qualified drive, path and filename of DMDB file to use or ~ for LTT extract jobs.
13	RS Check	Include data that failed quality checking (such as Reed-Solomon).	1 to include failed quality data 0 otherwise
14	LTT Flag	Job is a request to add data to the LTT database.	1 if the request is LTT, 0 for all other requests.
15	LTT Type	The interval of the LTT request this is. Only valid for LTT addition or extraction requests.	[DAY HOUR ORBIT INVALID]
16	DyP Flag	Request is submitted by Daily Production	Should always be 0 for manually submitted jobs
17	GMSEC Data	Used to differentiate between jobs using local data and those requiring data to be requested dynamically from a data server on the GMSEC bus.	0 Get data locally 1 Request data from GMSEC bus.
18	Status	Job status	Should always be PENDING
19	Custom Plot Definition File	Plot definition file for custom plot jobs. The custom definition file must already exist.	Filename only of .plot file (no path) for custom plot requests or ~ for default plots and for all other types of requests.
20	Product Type	Type of product to be generated.	For manually submitted jobs: [REPORT PLOT PLOTDEFAULT PLOTDEFINED LTTEXTRACT_REPORT LTTEXTRACT_PLOT] (Values of LTTEXTRACT_WEBREPORT LTTEXTRACT_WEBPLOT WEBPLOT WEBREPORT are also possible but not for manually submitted jobs.)

Field #	Title	Description	Value
21	Default Plot Flag	Specifies that a custom defined plot definition file is to be used.	<default ppdf> = 1 if default ppdf (no .plot file has yet been created), 0 otherwise
22	Start Delta	Used in Daily Production	~ for manually submitted jobs
23	Stop Delta	Used in Daily Production	~ for manually submitted jobs
24	Auto DMDB	Use automatic DMDB switching flag (see <i>Section 8.3 for more on setting up this feature</i>).	1 to activate automatic DMDB switching 0 otherwise
25	View	Optional viewer for completed jobs.	[SPREADSHEET TEXTEDITOR PLOTVIEWER PRINT NONE]
26	Orbit	When aligning jobs by orbit (for missions that have orbit information integrated into ITPS), the orbit number of this request.	Orbit number or 0
27	Percent Complete	Percent complete field. Used internally	0 for submitted jobs.
28	Time Remaining	Time remaining field – used internally	TBD for submitted jobs.
29	Job Execution Start	Used internally	TBD for submitted jobs.
30	Job Run Time	Used internally	TBD for submitted jobs.
31	Daily By Orbit Flag	Identifies job as a daily production 'by-orbit' job (see <i>Section 5.1</i>)	Should be 0 for manually submitted non daily production jobs (can be 1 for daily production by orbit 0 otherwise)
32	Start Orbit	Daily production by-orbit start orbit.	Should be ~ for manually submitted non daily production jobs
33	Stop Orbit	Daily production by-orbit stop orbit.	Should be ~ for manually submitted non daily production jobs
34	Use GRTIME	Use Ground Receipt time tagged data instead of default spacecraft time stamped data	0 spacecraft time 1 for ground receipt times

Field #	Title	Description	Value
35	Save as JPEG Flag	Specifies that plot data should automatically be saved as image files at job completion	1 if saving to image files (must be used in conjunction with "JPEG Directory" field), 0 otherwise.
36	JPEG Directory	Location to automatically store JPEG plot images	Drive and path for storage of JPEG images of plot data. Must be used in conjunction with "Save as JPEG Flag" field. Example: D:\GLAST\data\Jpegdir ~ otherwise.

Table 1 ITPS Decom.exe Command Line Fields

Appendix D Plot File Syntax

Plot definition files consist of the options used to generate the plot pages, graphs, and lines. The format of the .plot files is as described below. There should be only one command per line. Blank lines can be included anywhere. Each mnemonic related line should finish with a comma and each mnemonic subsection should finish with a semicolon. A single plot page may have up to 8 graphs on it (with a total of 16 mnemonics (pens) on each plot page). A plot file may contain no more than 200 pages. The last line of the file should say "endplot".

The syntax for these files is similar to GTAS plot files, but they differ in the header format. If using GTAS plot definition files ensure that the format described below is adhered to.

```
<title for top of every printed page.Should not contain "!"  
", " or";">
```

```
idf = <Filepath and Filename>
```

```
report = <output file name and path>
```

```
numpages = <Number of pages in plot>
```

```
<Plot Start time as yyyy-ddd-hh:mm:ss.mmm>
```

```
<Plot Stop time as yyyy-ddd-hh:mm:ss.mmm>
```

```
page = <page number>
```

```
.
```

```
.
```

```
[<mnemonic specification keywords and commands>]
```

```
[<mnemonic specification keywords and commands>]
```

```
.
```

```
.
```

```
endplot
```

Below is a description of the keywords and commands available for plot customization. The Plot Editor automatically places these commands in plot files. Please note that plot file syntax (and keywords) is case sensitive.

Plot File Keywords

Plot File Keywords	
color = <color>	Plot line color where <color> is: "black", "blue", "light_blue", "dark_green", "light_green", "magenta", "red", "orange", "yellow", "gray", "cyan".
graphtitle =	Free text title for current graph. (Has special use for '!'. See below)
Landscape	This option will send the plot to the printer in landscape mode.
Linestyle = n	Plot line style. Where n = 0 - solid line 1 - dotted line 2 - dashed line 3 - dashed dotted line 4 - dashed dot dot dot line
Newgraph	Display all subsequent mnemonics on a new graph.
Noconnect	Do not connect all data points with line. Default is to connect all points.
page = <n>	Begin new page number.
Print	If in batch mode, this option will print the current page. If in interactive mode, this option will set the toggle button in the print pages panel to active.
sciNotation	Display in scientific notation format. Default is floating point display.
symbol = n.	Symbol of data point to be plotted. 0 no symbol, connect with solid line 1 plus sign, "+" 2 asterisk, "*" 3 period, "." 4 diamond 5 triangle 6 square 7 X 8 circle
xdescription =	X-axis text description (need not be in quotes). May not contain exclamation point, comma or semicolon.
xrangehi =	Explicit upper range for x scale.

Plot File Keywords	
Xrangelow	Explicit lower range for x scale.
xsubticknum	Number of 'sub tick marks' for x-axis. 0 sets the number of sub-tickmarks back to the default.
xticklen = n	X tick mark length as a fraction of the graph size where "n" is a floating-point number between -0.1 and 0.5. A negative value produces tick marks that extend outside of the graph and 0.5 produces a full graph grid. The default value for the x-axis is 0.8 and .02 for the y-axis. 0 sets the length of tickmarks back to the default.
xticknum = n	Number of x-axis tick marks per grid. 0 sets the number of tickmarks back to the default. The maximum number of X-axis tickmarks is 15.
yconversion =	Y mnemonic conversion option: "EU" or "RAW"
ydescription =	Y-axis text description (need not be in quotes). May not contain exclamation point or semicolon.
yFormat	Number of decimal places to the right of the decimal point. Default is 4.
ylog	Plot y-axis in logarithmic scale. (Y scale values must be only positive numbers.)
ymnemonic =	Mnemonic selection for y-axis.
yrangehi	Explicit upper range for y-axis.
yrangelow	Explicit lower range for y-axis.
ysubticknum	Number of 'sub tick marks' for y-axis. 0 sets the number of sub-tickmarks back to the default.
Yticklen = n	X tick mark length as a fraction of the graph size where "n" is a floating point number between -0.1 and 0.5. 0 sets the length of tickmarks back to the default.
Yticknum = n	Number of y-axis tick marks per grid. 0 sets the number of tickmarks back to the default.
GridOn	This option will cause grid lines to appear on the graph.
XAxisType	Sets the X-axis labels to be a certain type 0 GMT time 1 Seconds from start of plot 2 Minutes from start of plot 3 Hours from start of plot 4 Days from start of plot

The following GTAS keywords are not supported on ITPS:

filter, keyonx, keyony, newaxis, x_mmm_interval, x_mmm_type, xmnemonic, y_mmm_interval, y_mmm_type, xconversion, xlog, smooth_num, nointerpolate.

PV-Wave uses special interpretation for the '!' (exclamation point or 'bang') character. When pwave sees this, it expects to see a character after it that signifies something special. As a result it is best to avoid use of the '!' in titles unless absolutely necessary. Incorrect use will result in an error.

The characters are:

- !A Shift above the division line.
- !E Shift up to the exponent level and decrease the character size by a factor of 0.44.
- !MX Insert a bullet character.
- !N Shift back to the normal level and original character size.
- !B Shift below the division line.
- !I Shift down to the index level and decrease the character size by a factor of 0.44.
- !! Display the ! symbol.

Appendix E ITPS Group Privileges

In order to protect the integrity of ITPS data and to designate particular users for certain critical tasks, some ITPS capabilities and features are limited to users who belong to particular ITPS groups. The four groups supported are: MOC, MOC-POWER, PDB_FM and WEB. Please note that users that do not belong to *any* of the ITPS groups will be unable to use ITPS software at all even if they have a valid account for access to the ITPS hosting computer. ITPS users may (and usually do) belong to more than one group.

The following table describes the groups and capabilities.

Capability	MOC	MOC-POWER	PDB_FM	WEB
May select Ingested file auto-delete Property (see <i>Appendix B.1</i>).		√		
May use Delete Archive tool to delete selected telemetry (see <i>Section 9.4.2</i>).		√		
May generate reports at the MOC (see <i>Section 4</i>)	√	√	√	
May generate plots at the MOC (see <i>Section 3</i>)	√	√	√	
May submit report and plot requests and view data via web.				√
May reorder pending job queue (see <i>Section 2.3</i>)	√	√	√	
May kill own submitted jobs (see <i>Section 2.3</i>)	√	√	√	
May kill other's submitted jobs (see <i>Section 2.3</i>)		√		
May kill jobs of web users (see <i>Section 2.3</i>)	√	√	√	
May create or delete DMDb (Decom Mnemonic Database) files (see <i>Section 8.2</i>)			√	

Appendix F Ingest Input File Naming Conventions

The ITPS Ingest program automatically detects new raw telemetry data, and compiles the data into the ITPS Archive files for internal use. Ingest will check for files in the directory specified in the “Ingest Telemetry Input Dir:” property outlined in Appendix B.1.

To ensure files not intended for ingesting are not ingested, ITPS expects telemetry files to conform to the naming convention outlined below.

Landsat 7:

External data for import: *.imp

Q Channel Data: LQdddx.xxx1

I Channel Data: LIdddx.xxx1

Where the last character is the number one (not the letter L).

External data for import: *.imp

Ingested LTAS Data: Layyyyddd.S000

where yyyy is the 4 digit representation of the year and ddd is the 3 digit representation of the day of year.

Landsat 4 and 5:

External data for import: *.imp

Tape Recorder Data: YYYYST5rxxxxy1.dat1 (or .d01)

PTP format files: *.rec

Realtime files: *.rt

where YYYY is the four-digit year in which the telemetry was accumulated. For telemetry files that cross over year boundaries it is recommended that the file timestamp be the year in which the telemetry ends. ST5r indicates that the files are playback.

ITPS System Users' Guide –Appendix E Ingest Input File Names

SOHO:

LZP Data: *.d01 or *.dat1
TPOCC Packet History: *.tpocc
IRTS Provided Data: *.irts
MDI Files : *.mdi
FDF Files (wheelspeed): *.fdf
External data for import: *.imp

WIND:

Level Zero Processor: .dat
External data for import: *.imp
TPOCC Packet History: *.tpocc
TPOCC Binary Subset: *.bin, *.ndx

POLAR:

Level Zero Processor: .dat
External data for import: *.imp
TPOCC Packet History: *.tpocc
TPOCC Binary Subset: *.bin, *.ndx

ST-5:

SFDU wrapped APIDs: .sfdu
External data for import: *.imp
APID files: *.itps

SDO:

SFDU wrapped APIDs: .sfdu
External data for import: *.imp
APID files: *.itps

GLAST:

External data for import: *.imp
APID files: *.itps

Appendix G Ingestion of External Data

ITPS users can import externally generated data points to the ITPS Archive for use in all product generation tasks. These imported values are added to the Archive of native telemetry and can be used in any ITPS analysis function including in the generation of user-generated pseudo-mnemonics.

Data can only be imported for mnemonics that are not already in the ITPS database as native mnemonics or as pseudo-mnemonics.

Imported mnemonics files are ingested into ITPS by the Ingest service (see Section 9) and must conform to the naming convention specified by the [Ingest] ImportedInputPatterns ini file property. Ingest expects the files to be located in the Ingest Telemetry Input Directory (see Section B.1 for more on this directory setting).

As with all ITPS files to be ingested, the files should not be created or moved into the Ingest Telemetry Input Directory while ingest is running and in a state where it will immediately attempt to process the files (before the creation or copying process is complete). Pause ingest while moving or creating the files to be imported as described in Section 9.2.

The format for the import files is:

- 2 line header
- n data lines

where the first header line is:

```
version|1.0
```

and the second header line is:

```
year|dayOfYear|millisecondsSinceDayStart|<M1>|<M2>|..|..|..|<Mn>
```

The format for each data line is:

```
<yyyy>|<ddd>|<millisecondsSinceDayStart>|<M1 val>|<M2 val>|<M3 val>
<yyyy>|<ddd>|<millisecondsSinceDayStart>|<M1 val>|<M2 val>|<M3 val>
<yyyy>|<ddd>|<millisecondsSinceDayStart>|<M1 val>|<M2 val>|<M3 val>
```

An example of the file format is listed below:

```
version|1.0
year|dayOfYear|millisecondsSinceDayStart|W1|W2|W3
2003|365|0|-425|-391|1577
2004|1|0|-428|-395|1588
2004|2|0|-432|-400|1599
2004|3|0|-436|-404|1610
2004|4|0|-440|-408|1621
2004|5|0|-444|-413|1631
2004|6|0|-448|-417|1642
```

Fields that do not have values (for a particular timestamp) should be left blank For example J2 and J3 do not have values for the record below:

year	dayOfYear	millisecondsSinceDayStart	J1	J2	J3	J4
2004	304	885000	304			45

Appendix H SOHO Specific Information

Ingestible APIDs

ITPS ingests SOHO housekeeping telemetry data contained in by-APID LZ format files and G042 format files. Based on the SOHO ODB and FOT needs, the following product files are ingested. Other products and APIDs (should they be encountered by the ITPS software) will be ignored.

Product	APID (decimal):	0x0APID
G010	0	0x00
G001	3	0x03
G002	5	0x05
G003	6	0x06
G004	9	0x09
G009	10	0x0A
G005	51	0x033
G006	53	0x035
G007	54	0x036
G008	57	0x039
G011	96	0x060
G012	99	0x063
G013	101	0x065
G014	102	0x066
G015	105	0x069
G016	106	0x06A
G017	108	0x06C
G018	111	0x06F
G041	147	0x093
G041	149	0x095
G022	150	0x096
G023	153	0x099
G024	154	0x09A
G025	156	0x09C
G042	(composite)	

FDF Wheel Speed Prediction Files

ITPS can ingest Wheel Speed Prediction files. The values in the files will be added to ITPS as mnemonics, which can be compared to the real wheel, speed values and examined using reports and plots.

The files are automatically ingested if they have a *.fdf* suffix, and are in the Ingest Telemetry Input Directory (see *Section B.1 for more on this directory setting*).

An example of the file format is listed below:

nx = 5.200e-07

ny = -7.000e-08
nz = -1.470e-06

Date	Day of Year	W1 RPM	W2 RPM	W3 RPM	hx NMS	ht NMS	Roll DEG	CRS roll DEG	CRS drift Rad
20040428.000000	119.00	-1275	335	1200	1.25	21.89	5.75	-97.71	-1.0184e-05
20040429.000000	120.00	-1282	341	1207	1.28	22.02	5.83	-97.81	-1.0130e-05
20040430.000000	121.00	-1288	348	1214	1.32	22.14	5.90	-97.91	-1.0020e-05
20040501.000000	122.00	-1295	354	1221	1.35	22.27	5.97	-98.01	-9.9072e-06
20040502.000000	123.00	-1302	360	1228	1.38	22.40	6.04	-98.11	-9.7915e-06
20040503.000000	124.00	-1309	367	1235	1.41	22.53	6.11	-98.20	-9.6729e-06

ITPS S/C Time References

The ITPS GUI refers to spacecraft time as GMT. Likewise, there are references in this document to GMT when referring to spacecraft time. The intention of this label is that ITPS references telemetry by the spacecraft time in the format of GMT (rather than local time). In the case of SOHO timestamping, the spacecraft time is actual in TAI format and not in GMT. In the case of SOHO, all references to GMT refer to TAI. Because of the generic nature of ITPS, the references to GMT remain (even though they do not apply for SOHO).

Appendix I Landsat 7 Pseudo-Mnemonics

Landsat 7 ITPS users can examine telemetry using combinations of mnemonics known as pseudo-mnemonics. The pseudo-mnemonics in place on the L7 MOC Real-time computer are available on ITPS. Please note that pseudo-mnemonics can only be generated when the telemetry mnemonics on which they are based are available in the telemetry stream.

NOTE: Mnemonics in bold font indicate the trigger, the arrival of which causes the equation to be executed.

Time Conversion Equations			
Algorithm	Converted Time	C_STRING System Variable	Units
Convert SFHLFSCNT half seconds of day count to hh:mm:ss.s	Spacecraft time	UHLFSCCNT	
Convert SFSMON_4 half seconds of day count to hh:mm:ss.s	Status monitor time	USMON_4	
Convert SFCMDT half seconds of day count to hh:mm:ss.s	Stored command time	UCMDT	
Convert SFCOMPEFLT_14 seconds of day count to ddd/hh:mm:ss	FSW time	USCTIM	
Convert SFCOMPEFLT_16 seconds of day count to ddd/hh:mm:ss	Corrected FSW time	UTUTC	
Convert SFCOMPEFLT_17 seconds of day count to ddd/hh:mm:ss	Time of clock correlation parameter update	UTCORUP	
Convert SFCOMPEFLT_19 seconds of day count to ddd/hh:mm:ss	Current ephemeris 1st node time	UTS1TIM	
Convert SFCOMPEFLT_26 seconds of day count to ddd/hh:mm:ss	PCD interpolation time	UINTERTIM	
Convert SFCOMPEFLT_27 seconds of day count to ddd/hh:mm:ss	Last ETM+ turn on time	UETMONTIM	
Convert SFCOMPEFLT_28 seconds of day count to ddd/hh:mm:ss	Last ETM+ turn off time	UETMOFFTIM	

NOTE: Mnemonics in bold font indicate the trigger, the arrival of which causes the equation to be executed.

Mathematical Derivation Equations			
Algorithm (all mnemonic values are EU values except equation results)	Result Description	Result Mnemonic CVT_DFP (raw)	Units
SFCOMPFLT_78 - TCGXA1AACR	Estimated GX1 across pointing error	UGXA1ACERR	deg
SFCOMPFLT_79 - TCGXA1AALG	Estimated GX1 along pointing error	UGXA1ALERR	deg
SFCOMPLFT_80 - TCGXA2AACR	Estimated GX2 across pointing error	UGXA2ACERR	deg
SFCOMPFLT_81 - TCGXA2AALG	Estimated GX2 along pointing error	UGXA2ALERR	deg
SFCOMPFLT_82 - TCGXA3AACR	Estimated GX3 across pointing error	UGXA3ACERR	deg
SFCOMPFLT_83 - TCGXA3AALG	Estimated GX3 along pointing error	UGXA3ALERR	deg
(YFHLFSEC_H * 65536) + YFHLFSEC_L	Standby SCT time, half second of day	USTBYHLFSEC	count

ITPS System Users' Guide – Appendix H Landsat 7 Pseudo-Mnemonics

NOTE: Mnemonics in bold font indicate the trigger, the arrival of which causes the equation to be executed.

Mathematical Derivation Equations			
Algorithm (all mnemonic values are EU values except equation results)	Result Description	Result Mnemonic CVT_DFP (raw)	Units
TPREGBUSIA + 0.1[(TPBAT1DSCI * TPBAT1FULV) + (TPBAT2DSCI * TPBAT2FULV)]^0.5 + 0.001[(TPBAT1DSCI * TPBAT1FULV) + (TPBAT2DSCI * TPBAT2FULV)]	Corrected Bus A current	UPCBUSA	amps
UPCBUSA + TPBAT1CHGI + TPBAT2CHGI + TPBAT1DSCI + TPBAT2DSCI (omitted 6/14/01 as per DR 143)	Spacecraft current Bus A	UPLOADCURA	amps
TPREGBUSIB + 0.1[(TPBAT1DSCI * TPBAT1FULV) + (TPBAT2DSCI * TPBAT2FULV)]^0.5 + 0.001[(TPBAT1DSCI * TPBAT1FULV) + (TPBAT2DSCI * TPBAT2FULV)]	Corrected Bus B current	UPCBUSB	amps
UPCBUSB + TPBAT1CHGI + TPBAT2CHGI + TPBAT1DSCI + TPBAT2DSCI (omitted 6/14/01 as per DR 143)	Spacecraft current Bus B	UPLOADCURB	amps
[0.092 * [(TPBAT1DSCI * TPBAT1FULV) + (TPBAT2DSCI * TPBAT2FULV)]/ TPREGBUSVA] + TPSAI - TPBAT1CHGI - TPBAT2CHGI	Alternate corrected 28v Bus A current	UPCBUSA_ALT	amps
[0.092 * [(TPBAT1DSCI * TPBAT1FULV) + (TPBAT2DSCI * TPBAT2FULV)]/ TPREGBUSVB] + TPSAI - TPBAT1CHGI - TPBAT2CHGI	Alternate corrected 28v Bus B current	UPCBUSB_ALT	amps
TPBAT1AT1 - TPBAT1BT1	Bat1 pack temp delta	UPB1TMPDEL	°C
TPBAT2AT1 - TPBAT2BT1	Bat2 pack temp delta	UPB2TMPDEL	°C
{[1 - ((p@SCOMPFLT_28) / 205000)] * 100}	Bat1 depth of discharge	UPB1DOD	%
{((p@SCOMPFLT_28) / 205000) * 100}	Bat1 state of charge	UPB1SOC	%
{[1 - ((p@SCOMPFLT_29) / 205000)] * 100}	Bat2 depth of discharge	UPB2DOD	%
{((p@SCOMPFLT_29) / 205000) * 100}	Bat2 state of charge	UPB2SOC	%
TPBAT1HAFV / 8	Bat1-A avg cell voltage	UPB1AAVGCV	volts
(TPBAT1FULV - TPBAT1HAFV) / 9	Bat1-B avg cell voltage	UPB1BAVGCV	volts
UPB1AAVGCV - UPB1BAVGCV	Bat1 V pack delta	UPB1VDEL	volts
TPBAT2HAFV / 8	Bat2-A avg cell voltage	UPB2AAVGCV	volts
(TPBAT2FULV - TPBAT2HAFV) / 9	Bat2-B avg cell voltage	UPB2BAVGCV	volts
UPB2AAVGCV - UPB2BAVGCV	Bat2 V pack delta	UPB2VDEL	volts
TPSAI + TPSHUNTI	Actual solar array current	UPARRAYOUT	amps
UPARRAYOUT * TPREGBUSVA	Solar array power	UPSAPWR	watts
[arcsin (SFCOMPFLT_98)*2] * (180/3.1416)	Slewed EPD quaternion	UFEYESLEW_2	deg
(TETSCNTM * 256) + TETSCNTL	Scan counter	UESCANCNTR	cts
0.1885 * [(TETSN1FEM * 256) + TETSN1FEL]	ETM+ 1st half scan error for scan N-1	UE1STHFERRN1	μs
0.1885 * [(TETSN2FEM * 256) + TETSN2FEL]	ETM+ 1st half scan error for scan N-2	UE1STHFERRN2	μs
0.1885 * [(TETSN1SEM * 256) + TETSN1SEL]	ETM+ 2ND half scan error for scan N-1	UE2NDHFERRN1	μs

ITPS System Users' Guide – Appendix H Landsat 7 Pseudo-Mnemonics

NOTE: Mnemonics in bold font indicate the trigger, the arrival of which causes the equation to be executed.

Mathematical Derivation Equations			
Algorithm (all mnemonic values are EU values except equation results)	Result Description	Result Mnemonic CVT_DFP (raw)	Units
$0.1885 * [(TETSN2SEM * 256) + TETSN2SEL]$	ETM+ 2ND half scan error for scan N-2	UE2NDHFERRN2	μs
$0.1885 * [(TETSNTPM * 256) + TETSNTPPL]$	Torque pulse scan N	UETORQPULSN	μs
$0.1885 * [(TETSN1TPM * 256) + TETSN1TPL]$	Torque pulse scan N-1	UETORQPULSN1	μs
$0.1885 * [(TETSNTEM * 256) + TETSNTEL]$	Turnaround error scan N	UETURNERN	μs
$0.1885 * [(TETSN1TEM * 256) + TETSN1TEL]$	Turnaround error scan N-1	UETURNERN1	μs
$0.1885 * [(TETSN2STM * 65536) + (TETSN2STI * 256) + TETSN2STL]$	Scan time for scan N-1	UESCANTIMN2	μs
$0.1885 * [(TETSN1SUM * 65536) + (TETSN1SUI * 256) + TETSN1SUL]$	Sum of errors scan N-1	UESUMERRSN1	μs
$0.1885 * [(TETSN2SUM * 65536) + (TETSN2SUI * 256) + TETSN2SUL]$	Sum of errors scan N-2	UESUMERRSN2	μs
TDSSRHRC * 0.033	Duration of dump to empty SSR h/k	UDSSRDMPDUR	min
TDSSRHPC * 0.033	Time left in SSR h/k dump	UDSSRDMPTME	min

NOTE: Mnemonics in bold font indicate the trigger, the arrival of which causes the equation to be executed.

Logical Derivation Equations			
Result Mnemonic [CVT_ULI (raw) Units] and Result Description	Algorithm (P@ means engineering units)	State	Desirability (G=good C=caution B=bad)
UAMPTAI MPT Coil A Drive Current	if P@ TAMPTAI <= 1.0 and P@TAMPTAI >= -1.0 if P@TAMPTAI <= 300.0 and P@TAMPTAI >= 190.0 else	OFF ON IN TRANSITION	C G G
UAMPTAIPOI Pitch MPT A Polarity	if TAMPTAI <= 163 && TAMPTAI >= 0 if TAMPTAI <= 255 && TAMPTAI >= 164 else	NEGATIVE POSITIVE IN TRANSITION	G G G
UAMPTBI MPT Coil B Drive Current	if P@ TAMPTBI <= 1.0 and P@TAMPTBI >= -1.0 if P@TAMPTBI <= 300.0 and P@TAMPTBI >= 190.0 else	OFF ON IN TRANSITION	C G G
UAMPTBIPOI Pitch MPT B Polarity	if TAMPTBI <= 163 && TAMPTBI >= 0 if TAMPTBI <= 255 && TAMPTBI >= 164 else	NEGATIVE POSITIVE IN TRANSITION	G G G
UAMRTAI MRT Coil A Drive Current	if P@ TAMRTAI <= 1.0 and P@TAMRTAI >= -1.0 if P@TAMRTAI <= 300.0 and P@TAMRTAI >= 190.0 else	OFF ON IN TRANSITION	C G G
UAMRTAIPOI Roll MRT A Polarity	if TAMRTAI <= 163 and TAMRTAI >= 0 if TAMRTAI <= 255 and TAMRTAI >= 164 else	NEGATIVE POSITIVE IN TRANSITION	G G G
UAMRTBI MRT Coil A Drive Current	if P@ TAMRTBI <= 1.0 and P@TAMRTBI >= -1.0 if P@TAMRTBI <= 300.0 and P@TAMRTBI >= 190.0 else	OFF ON IN TRANSITION	C G G
UAMRTBIPOI Roll MRT B Polarity	if TAMRTBI <= 163 and TAMRTBI >= 0 if TAMRTBI <= 255 and TAMRTBI >= 164 else	NEGATIVE POSITIVE IN TRANSITION	G G G

ITPS System Users' Guide – Appendix H Landsat 7 Pseudo-Mnemonics

NOTE: Mnemonics in bold font indicate the trigger, the arrival of which causes the equation to be executed.

Logical Derivation Equations			
Result Mnemonic [CVT_ULI (raw) Units] and Result Description	Algorithm (P@ means engineering units)	State	Desirability (G=good C=caution B=bad)
UCSW12ON SBT1 & SBT2 Transmitter Power Status	if TCSBT1TPWR = 0 and TCSBT2TPWR = 0 else	BOTH OFF NOT BOTH OFF	G G
UCXTMONS2 M1 & M2 Power Status	if TCXTXM1ON = 0 and TCXTXM2ON = 0 else	BOTH OFF NOT BOTH OFF	G G
UEFACPPSWP FAC Pull-Pin Switch Primary Status	if TEFACPPSWP < 25 if TEFACPPSWP > 225 else	CLOSED OPEN IN TRANSITION	G G G
UEFACPPSWR FAC Pull-Pin Switch Redundant Status	if TEFACPPSWR < 25 if TEFACPPSWR > 225 else	CLOSED OPEN IN TRANSITION	G G G
UPBVRALLEN BVR Chn 1B & 2C Status	if TPBVRCH1B = 1 and TPBVRCH2C = 1 else	ENABLE NOT ENABLE	G G
UPSCA Shunt Cont. Amps A & B Status	if TPSCAA = 1 and TPSCAB = 1 else	BOTH ON NOT BOTH ON	G G
URCBHTR Primary and Redundant Catbed Heaters Status	if TRCBHTRPRI = 1 or TRCBHTRRED = 1 else	ON OFF	G C
URLVOPEN Latch Valves 2 & 2 Status	if TRLV1OPEN = 1 or TRLV2OPEN = 1 else	OPEN CLOSE	G B
USADFWOREV SA Swapbit & Sadfwdrev Status	if SFSASWAPBIT = 0 and SFSADFWOREV = 0 if SFSASWAPBIT = 0 and SFSADFWOREV = 1 if SFSASWAPBIT = 1 and SFSADFWOREV = 1 if SFSASWAPBIT = 1 and SFSADFWOREV = 0	USAD_REV_0 USAD_FWD_0 USAD_REV_1 USAD_FWD_1	C G C G
UECDDRPOS Cooler Door Position	if TECDDRMTR = 0 if TECDDRMTR = 1 and TECDDRFO = 1 and TECDDROG = 0 and TECDDRCL = 0 if TECDDRMTR = 1 and TECDDRFO = 0 and TECDDROG = 1 and TECDDRCL = 0 if TECDDRMTR = 1 and TECDDRFO = 0 and TECDDROG = 0 and TECDDRCL = 1 else	NA OPEN OUTGAS CLOSED ERROR	G G C C B
UEFACPOS FAC Paddle Position	if TEFACPCTRON = 0 if ((TEFACPCTRON = 1 and TEFACPSTOW = 1)) or (TEFACPCTRON = 1 and TEFACRSTOW = 1)) if ((TEFACPCTRON = 1 and TEFACPCAL = 1) or (TEFACPCTRON = 1 and TEFACRCAL = 1)) else	NA STOW CAL ERROR	G G C B
UEFACPMTRON FAC Primary Motor Motion	if TEFACPCTRON = 0 if TEFACPCTRON = 1 and TEFACPMTRON = 1 if TEFACPCTRON = 1 and TEFACPMTRON = 0	NA MOVING STATIC	G C G
UEFACFMTRON FAC Failsafe Motor Motion	if TEFACFCTRON = 0 if TEFACFCTRON = 1 and TEFACFMTRON = 1 if TEFACFCTRON = 1 and TEFACFMTRON = 0	NA MOVING STATIC	G C G
UEFACPCDIR FAC Direction (Primary)	if TEFACPCTRON = 0 if TEFACPCTRON = 1 and TEFACPCDIR = 1 if TEFACPCTRON = 1 and TEFACPCDIR = 0	NA CAL STOW	G G G
UEFACFCDIR FAC Direction (Failsafe)	if TEFACFCTRON = 0 if TEFACFCTRON = 1 and TEFACFCDIR = 1 if TEFACFCTRON = 1 and TEFACFCDIR = 0	NA CAL STOW	G G G

ITPS System Users' Guide – Appendix H Landsat 7 Pseudo-Mnemonics

NOTE: Mnemonics in bold font indicate the trigger, the arrival of which causes the equation to be executed.

Logical Derivation Equations			
Result Mnemonic [CVT_ULI (raw) Units] and Result Description	Algorithm (P@ means engineering units)	State	Desirability (G=good C=caution B=bad)
UEFACPSTEP FAC SingleStep Size (Primary)	if TEFACPCTRON = 0 if TEFACPCTRON = 1 and TEFACPSTEP = 0 if TEFACPCTRON = 1 and TEFACPSTEP = 1	NA FINE COARSE	G G G
UEFACFSTEP FAC SingleStep Size (Failsafe)	if TEFACFCTRON = 0 if TEFACFCTRON = 1 and TEFACFSTEP = 0 if TEFACFCTRON = 1 and TEFACFSTEP = 1	NA FINE COARSE	G G G
UEFACPMVON FAC Move Enable Status (Primary)	if TEFACPCTRON = 0 if TEFACPCTRON = 1 and TEFACPMVON = 1 if TEFACPCTRON = 1 and TEFACPMVON = 0	NA ENABLE DISABLE	G C G
UEFACRMVON FAC Move Enable Status (Failsafe)	if TEFACFCTRON = 0 if TEFACFCTRON = 1 and TEFACRMVON = 1 if TEFACFCTRON = 1 and TEFACRMVON = 0	NA ENABLE DISABLE	G C G
UEPS1AON Power Supply 1A ON	if p@ TEPS1AI => 0.4 if p@ TEPS1AI < 0.4	ON OFF	G G
UEPS2AON Power Supply 2A ON	if p@ TEPS2AI => 0.4 if p@ TEPS2AI < 0.4	ON OFF	G G
UESME1SAM SME 1 SAM/Bumper Selection	if p@TEPS1AI < 0.4 if p@TEPS1AI => 0.4 and TESME1ON = 1 and TESME1SAM =1 if p@TEPS1AI => 0.4 and TESME1ON = 1 and TESME1SAM = 0 else	NA SAM BUMPER NA	G G C G
UECSHPLK Cal Shutter Phase Lock Status	if p@TEPS1AI < 0.4 if p@TEPS1AI => 0.4 and TECSHON = 1 and TECSHPLK = 1 if p@TEPS1AI => 0.4 and TECSHON = 1 and TECSHPLK = 0 if p@TEPS1AI => 0.4 and TECSHON = 0	NA YES NO NO	G G C C
UECSHMLK Cal Shutter Amplitude Lock Status	if p@TEPS1AI < 0.4 if p@TEPS1AI => 0.4 and TECSHON = 1 and TECSHMLK = 1 if p@TEPS1AI => 0.4 and TECSHON = 1 and TECSHMLK = 0 if p@TEPS1AI => 0.4 and TECSHON = 0	NA YES NO NO	G G C C
UEBSHPLK Backup Shutter Phase Lock Status	if p@TEPS1AI < 0.4 if p@TEPS1AI => 0.4 and TEBSHON = 1 and TEBSHPLK =1 if p@TEPS1AI => 0.4 and TEBSHON = 1 and TEBSHPLK =0 if p@TEPS1AI => 0.4 and TEBSHON = 0	NA YES NO NO	G B G G
UEBSHMLK Backup Shutter Amplitude Lock Status	if p@TEPS1AI < 0.4 if p@TEPS1AI => 0.4 and TEBSHON = 1 and TEBSHMLK = 1 if p@TEPS1AI => 0.4 and TEBSHON = 1 and TEBSHMLK = 0 if p@TEPS1AI => 0.4 and TEBSHON = 0	NA YES NO NO	G B G G
UEBSHON Backup Shutter Status	if p@TEPS1AI < 0.4 if p@TEPS1AI => 0.4 and TEBSHON = 1 if p@TEPS1AI => 0.4 and TEBSHON = 0	NA ON OFF	G B G
UECSHON Cal Shutter Status	if p@TEPS1AI < 0.4 if p@TEPS1AI => 0.4 and TECSHON = 1 if p@TEPS1AI => 0.4 and TECSHON = 0	NA ON OFF	G G C

ITPS System Users' Guide – Appendix H Landsat 7 Pseudo-Mnemonics

NOTE: Mnemonics in bold font indicate the trigger, the arrival of which causes the equation to be executed.

Logical Derivation Equations			
Result Mnemonic [CVT_ULI (raw) Units] and Result Description	Algorithm (P@ means engineering units)	State	Desirability (G=good C=caution B=bad)
UECLAMP1ON Cal Lamp 1 Status	if p@TEPS1AI < 0.4 if p@TEPS1AI => 0.4 and TECLAMP1ON = 1 if p@TEPS1AI => 0.4 and TECLAMP1ON = 0	NA ON OFF	G G C
UECLAMP2ON Cal Lamp 2 Status	if p@TEPS1AI < 0.4 if p@TEPS1AI => 0.4 and TECLAMP2ON = 1 if p@TEPS1AI => 0.4 and TECLAMP2ON = 0	NA ON OFF	G C G
UECDDRMTR Cooler Door Motor Status	if p@TEPS1AI < 0.4 if p@TEPS1AI => 0.4 and TECDDRMTR = 1 if p@TEPS1AI => 0.4 and TECDDRMTR = 0	NA ON OFF	G C G
UEMDE1ON MUX 1 MDE Status	if p@TEPS1AI < 0.4 if p@TEPS1AI => 0.4 and TEMX1MDEON = 1 if p@TEPS1AI => 0.4 and TEMX1MDEON = 0	NA ON OFF	G G G
UEMDE2ON MUX 2 MDE Status	if p@TEPS1AI < 0.4 if p@TEPS1AI => 0.4 and TEMX2MDEON = 1 if p@TEPS1AI => 0.4 and TEMX2MDEON = 0	NA ON OFF	G C G
UESLC1ON Scan Line Corrector 1 Status	if p@TEPS1AI < 0.4 if p@TEPS1AI => 0.4 and TESLC1ON = 1 if p@TEPS1AI => 0.4 and TESLC1ON = 0	NA ON OFF	G G C
UESLC2ON Scan Line Corrector 2 Status	if p@TEPS1AI < 0.4 if p@TEPS1AI => 0.4 and TESLC2ON = 1 if p@TEPS1AI => 0.4 and TESLC2ON = 0	NA ON OFF	G C G
UESME1ON Scan Mirror Electronics 1 Status	if p@TEPS1AI < 0.4 if p@TEPS1AI => 0.4 and TESME1ON = 1 if p@TEPS1AI => 0.4 and TESME1ON = 0	NA ON OFF	G G C
UESME2ON Scan Mirror Electronics 2 Status	if p@TEPS1AI < 0.4 if p@TEPS1AI => 0.4 and TESME2ON = 1 if p@TEPS1AI => 0.4 and TESME2ON = 0	NA ON OFF	G C G
UEISHTRCON Intermediate Stage Outgas Heater Controller Status	if p@TEPS1AI < 0.4 if p@TEPS1AI => 0.4 and TEISHTRCON = 1 if p@TEPS1AI => 0.4 and TEISHTRCON = 0	NA ON OFF	G C G
UEMUX1ON MUX 1 Status	if p@ TEMX1INPID => 1.0 and p@TEMX1INPIA => 1.0 else	ON OFF	G G
UEMUX2ON MUX 2 Status	if p@ TEMX2INPID => 1.0 and p@TEMX2INPIA => 1.0 else	ON OFF	C G
UEDCRSTNOR Shutter DC Restore Selection	if p@TEPS1AI < 0.4 if p@TEPS1AI => 0.4 and TECSHON = 1 and TEDCRSTNOR =1 if p@TEPS1AI => 0.4 and TEBSHON = 1 and TEDCRSTNOR = 0 else	NA CALSHTR BACKUP ERROR	G G C C
UEMX1B1GS Band 1 Gain (MUX1)	p@ TEMX1INPID => 1.0 and TEMXDPWR = 0 and TEMX1B1GS = 0 p@ TEMX1INPID => 1.0 and TEMXDPWR = 0 and TEMX1B1GS = 1 else	HI LO NA	G G G
UEMX1B2GS Band 2 Gain (MUX1)	p@ TEMX1INPID => 1.0 and TEMXDPWR = 0 and TEMX1B2GS=0 p@ TEMX1INPID => 1.0 and TEMXDPWR = 0 and TEMX1B2GS=1 else	HI LO NA	G G G

ITPS System Users' Guide – Appendix H Landsat 7 Pseudo-Mnemonics

NOTE: Mnemonics in bold font indicate the trigger, the arrival of which causes the equation to be executed.

Logical Derivation Equations			
Result Mnemonic [CVT_ULI (raw) Units] and Result Description	Algorithm (P@ means engineering units)	State	Desirability (G=good C=caution B=bad)
UEMX1B3GS Band 3 Gain (MUX1)	p@ TEMX1INPID => 1.0 and TEMXDPWR = 0 and TEMX1B3GS = 0	HI	G
	p@ TEMX1INPID => 1.0 and TEMXDPWR = 0 and TEMX1B3GS = 1	LO	G
	else	NA	G
UEMX1B4GS Band 4 Gain (MUX1)	p@ TEMX1INPID => 1.0 and TEMXDPWR = 0 and TEMX1B4GS = 0	HI	G
	p@ TEMX1INPID => 1.0 and TEMXDPWR = 0 and TEMX1B4GS = 1	LO	G
	else	NA	G
UEMX1B5GS Band 5 Gain (MUX1)	p@ TEMX1INPID => 1.0 and TEMXDPWR = 0 and TEMX1B5GS = 0	HI	G
	p@ TEMX1INPID => 1.0 and TEMXDPWR = 0 and TEMX1B5GS = 1	LO	G
	else	NA	G
UEMX1B6GP Band 6P Gain (MUX1)	p@ TEMX1INPID => 1.0 and TEMXDPWR = 0 and TEMX1B6GP = 0	HI	Y
	p@ TEMX1INPID => 1.0 and TEMXDPWR = 0 and TEMX1B6GP = 1	LO	G
	else	NA	G
UEMX1B6GR Band 6R Gain (MUX1)	p@ TEMX1INPID => 1.0 and TEMXDPWR = 0 and TEMX1B6GR = 0	HI	G
	p@ TEMX1INPID => 1.0 and TEMXDPWR = 0 and TEMX1B6GR = 1	LO	Y
	else	NA	G
UEMX1B7GS Band 7 Gain (MUX1)	p@ TEMX1INPID => 1.0 and TEMXDPWR = 0 and TEMX1B7GS = 0	HI	G
	p@ TEMX1INPID => 1.0 and TEMXDPWR = 0 and TEMX1B7GS = 1	LO	G
	else	NA	G
UEMX1BPGS Pan Band Gain (MUX1)	p@ TEMX1INPID => 1.0 and TEMXDPWR = 0 and TEMX1BPGS = 0	HI	G
	p@ TEMX1INPID => 1.0 and TEMXDPWR = 0 and TEMX1BPGS = 1	LO	G
	else	NA	G

Appendix J WIND and POLAR Level Zero Block Locations

WIND and POLAR telemetry is added to ITPS in files that are in Ground System Data Processing System Level Zero format. These files contain a housekeeping subset of the mission telemetry, which varies based on the mode of the spacecraft telemetry mode. As a result, ITPS will only display mnemonics that are available in plots and reports. Likewise, mnemonics that never appear in ITPS data are not listed in either the IDF editor or the Mnemonic Browser.

Information regarding which byte locations block formats and in the Ground System Data Processing System Level Zero format blocks is available in the DFCD Between ISTP MOSDD Ground System Data Processing System and the ISTP Mission Investigators, (560-IDFD/0190 CSC/RT-91/6014) Revision 2, May 1996 Section 3.3.3.

Appendix K GMSEC Configuration

GMSEC (as it is used in this document) is a set of technologies that enables interconnection and communication among various GMSEC enabled components. For more information on GMSEC components and technologies please see gmsec.gsfc.nasa.gov.

There are several types of capabilities that are currently enabled using the GMSEC technologies. Primary among these is the generation of heartbeat messages. When enabled, selected ITPS components (Request Queue, Ingest, Event Logger) will generate a heartbeat message to any subscribed GMSEC clients. In addition, ITPS event messages may be published on the GMSEC, enabling any subscribed component to read the ITPS generated event messages. When the heartbeats and event messages are combined with event and heartbeat messages from other MOC components a centralized monitoring system can give an FOT insight into the overall functionality of all GMSEC enabled MOC components.

The activation of these capabilities is controlled via the `ini` file `[ITPS]UseGmsec=1` property.

Note: This property should only be set to "1" if there is a working GMSEC bus and server available. Setting this to "1" at sites without a working GMSEC bus or server, may result in ITPS components failing.

There are additional capabilities that can be enabled, such as allowing remote users to submit product requests (for plots, reports and LTT addition and extractions) to ITPS via GMSEC, and directing ITPS to receive telemetry (either as a packet or as a mnemonic data point) from a data server or from a T&C via GMSEC. These matters are beyond the scope of this document and are not discussed here as they should be addressed by ITPS developers.

There is a class of properties that controls the functionality and configuration of the ITPS GMSEC components. These are described in Appendix B Section B.1.

Appendix L Data Capture Utilities

At some ITPS mission installations (such as SOHO, ST-5 and SDO) the raw telemetry data is continually acquired by utilities. These utilities receive data from a front end computer (such as FEDS or IRTS). Once read, the data is stored in files which are then automatically ingested by the ITPS Ingest service (described in Section 9).

L.1 ReadFeds

The ReadFeds utility establishes a client socket connection to a predefined port on the mission FEDS computer and reads APID packets for use by ITPS. The tool then stores the data for a predefined timeframe before closing the file and transferring it to the ITPS Ingest service.

The utility has been enhanced by the Kevin McMahon of the ST-5 FOT to include a perl based Windows service functionality, and a user interface. The service wrapper allows the ReadFeds script to start up automatically as part of the ITPS computer boot process, and is not affected by whether a user is logged into the computer. This enables the acquisition of data by ITPS to continue without any user intervention.

The user interface reports the status of the ReadFeds utility and allows users to configure and control the behavior of the utility, without having to resort to restarting the service (which can only be done by a user with Windows Administrator privileges). In addition it allows the user to pause execution of the utility.

Note: Neither the launching of the user interface nor exiting from it affects the actual acquisition of data. This is accomplished by the ReadFeds utility which while configured by the user interface runs independently from it.

The utility is normally installed and configured during system installation, and is not accessed directly by the ITPS user. The data capture utility interface is similarly installed during installation, and a shortcut to the `launch.pl` data capture user interface is available on the user desktop.



Figure 148 ReadFeds Data Capture Interface

When modifying any of the utility properties, the interface creates a temporary configuration file called “new.cfg” based on user selections. The utility will monitor for this new configuration file and will incorporate it into the `default.cfg` file used during operations at appropriate intervals.

To change the utility configuration:

- Select the FEDS to which to connect to from the upper left-hand side of the screen (see *Figure 148*).
- Choose the computer network configuration (Open IONET or CNE).
- Change the configuration property as needed.

- Click on the “Use this Configuration” button on the lower left-hand side. Confirm as asked.
- Click the “Refresh” button to update the data capture setup window.

Note: Changes to configuration do not take effect immediately. They take effect at opportune points – such as the time between writing data files.

Appendix MITPS Acronyms and Abbreviations

Acronym	Description
AN	ascending node
APID	Application Process Identifications
ASCII	American Standard Code for Information Interchange
BIN	binary
CDHF	Central Data Handling Facility
cmd	Command
csv	comma separated value
Data_rep	data representation
Datab	data table
DEC	decimal
Dir	directory
dmdb	Mnemonic Database
DN	descending node
DPS	Data Processing System
DUS	Data Unit Summary
EDOS	Earth Observing System (EOS) Data and Operations System
EU	engineering unit
FDF	Flight Dynamics Facility
FEDS	Front End Data Server
Fsw	flight software
FTP	file transfer protocol
GMSEC	Goddard Mission Service Evolution Center
Gawk	Gnu (Gnu is not Unix) AWK (Aho Weinberg Kernighan)
GIF	Graphics Interchange Format
GMT	Greenwich mean time
GTAS	Generic Trending and Analysis System
HEX	hexadecimal
HW	hardware
IDF	input definition file
Ini	initialization file

ITPS System Users' Guide –Appendix J Acronyms and Abbreviations

IONET	Internet Protocol (IP) Operational Network
IPDU	Internet Protocol Data Unit
IRTS	ISTP Real-Time Subsystem
ISTP	International Solar Terrestrial Physics Program
ITPS	Integrated Trending and Plotting System
JPEG	Joint Photographic Experts Group
L7	Landsat 7
LI	Inphase modulated Landsat housekeeping telemetry file.
LQ	Quadra-phase modulated Landsat 7 playback data file.
LS7	Landsat 7
LTT	Lifetime Trend
LZP	Level Zero Processor
MAX	maximum
MDI	Michelson Doppler Imager
MIN	minimum
MOC	Mission Operations Center
Modal	A limit condition that has more than one mode. E.g. TCGXA1BACR is Red-High when ≥ 66 and SFGDE0HOMECRS = 0. TCGXA1BACR is Red-High when ≥ 67.7 and SFGDE0HOMECRS = 1
NA	not applicable
NASA	National Aeronautics and Space Administration
NT	New Technology (Microsoft ®)
ODB	Operational Database
openssh	Open SSH
ORB	orbital
PB-5	Parallel Grouped Binary Time Format mode 5
PDB	Project Database
PPDF	Plot Parameter Definition File
QAC	Quality and Accounting Capsule
REQ	request
RS	Reed-Solomon
R-S	Reed-Solomon

ITPS System Users' Guide –Appendix J Acronyms and Abbreviations

S/C	spacecraft
SD	Source Data
SDU	Source Data Unit
SOHO	Solar and Heliospheric Observatory
SSH	Secure Shell
STK	Satellite Tool Kit
SUM	System Users' Manual
sw.	Software
TAI	Temps Atomique International
TDF	Time Definition File
tlm / Tlm	telemetry
TPOCC	Transportable Payload Operations Control Center (POCC)
UI	unsigned integer
UINT	unsigned integer
USGS	United States Geological Survey
VCDU	virtual channel data unit